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Vol. 95 No. 12 DECEMBER 1955

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AMERICAN BEE JOURNAL **Hamilton, Illinois**

THE AMERICAN BEE JOURNAL

HAMILTON, ILLINOIS

Vol. 95, No. 12 December, 1955

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CONTENTS

OUR COVER PICTURE

John Allen, West Lafayette, Indiana, comes in again for Christmas with this picture which has been used before. We have no idea who these little fellows are but it's a close shot they are grandsons. Anyway, how better could the spirit of Christmas be expressed? You just feel the deep spiritual emotion of the occasion. Perhaps no other time of year so buries up everyday things and allows man's highest nature to become expressed.

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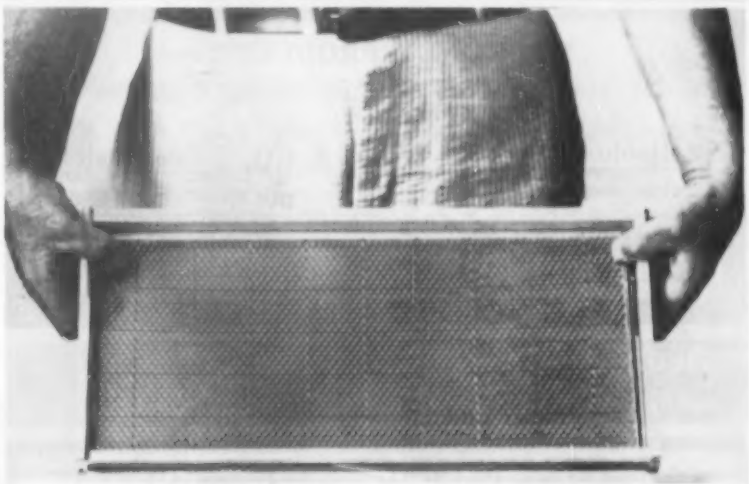

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Queens	1.25	1.15	1.00

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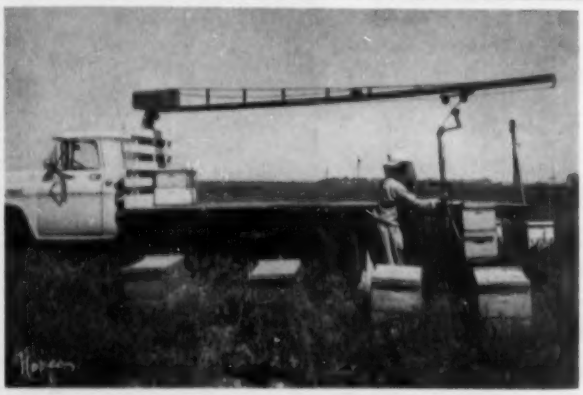

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A membership in the Sioux Honey Association is valuable to every beekeeper, large or small and your inquiry about membership will be welcome. Over one hundred new members have been added in the past year and the list continues to grow.

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Lima, Ohio; Rogers, Texas; Tacoma, Washington; Anaheim, California; Waycross, Georgia

No Bees, No Melons - - Credit Given to Nature's Helpers

by S. E. McGregor and Frank E. Todd

(Reprinted from "Progressive Agriculture in Arizona" Vol. 4, No. 2, July, August, September 1952, page 3.)

"A $15,000,000 melon crop during 1950 was produced by Arizona growers and shippers."

This was the lead sentence in an article "Arizona Melons" in a 1951 issue of **Progressive Agriculture In Arizona,** which showed graphically the various links in the chain of producing this crop of melons. One of these links was listed as "pollination by bees," the importance of which was proved in an experiment in 1950 on the Leo Smith farm west of Phoenix.

Cages large enough to cover 40 full-grown cantaloup plants each were set over the plants when the first blossoms appeared. A colony of honey bees was placed in each cage of one group, and from other cages bees were excluded. Open plots, of the same area covered by a cage, were staked off for comparative study. From another group of cages, bees were excluded the first three weeks of flowering; then a colony of bees was placed in each.

Bees Get Results

Results were clear-cut. The cages having bees continuously produced marketable melons at the rate of 272 crates per acre, the cages without bees only seven!

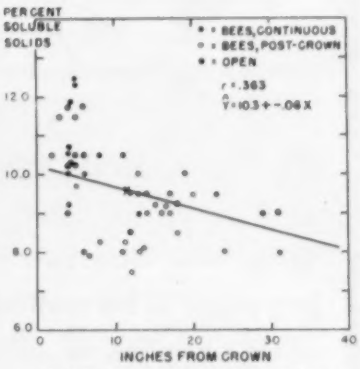
The open plots produced at the rate of 213 crates per acre, an indication that they did not get sufficient bee pollination. There were three colonies of bees within 100 yards of the plots, but there were many acres of melons surrounding them. Apparently the bees available were unable to pollinate adequately all the flowers in the area.

The cages from which bees were excluded the first half of the flowering period produced as many melons, 274 crates per acre, but none set before bees were added. There was no "crown set."

First Flowers Best

The experiment showed conclusively that the nearer the crown of the plant the melon was produced, the sweeter it was. This means that to get the best melons the grower should have ample bees available when the first flowers appear.

By counting the seeds in the melons from these different treatments it was learned that repeated bee visitation to the individual flowers increased the number of seeds.



RELATION OF DISTANCE OF MELON FROM CROWN AND ITS PER CENT OF SOLUBLE SOLIDS.

Melons with fewer than 400 seeds were misshapen or below market size.

Although the consumer is not interested in the seeds of the cantaloup, he does want a good sweet melon. If adequate pollination does not take place early in the life of the plant the melon is not sweet.

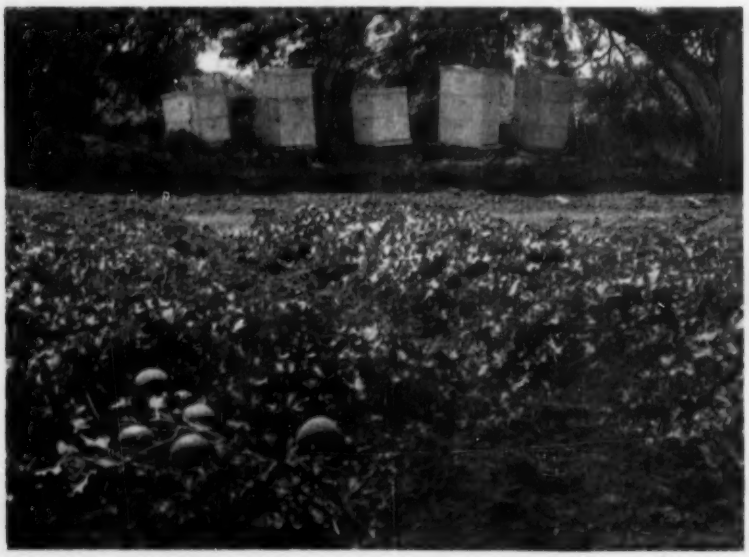
Close observation of insects visiting cantaloup flowers revealed that honey bees, and only honey bees, were effective in pollinating cantaloups. Pollinating insects other than honey bees were practically nonexistent. Thrips were present in all the flowers but were ineffective as pollinators.

One Colony Per Acre Needed

On the basis of this experiment, honey bee colonies in or by the melon field at the rate of a colony per acre is considered adequate to insure thorough pollination. The bees should be present at the beginning of flowering if the grower wants to produce the greatest quantity of the best quality of melons, and maintain or increase that $15,000,000 Arizona income.

—S. E. McGregor and Frank E. Todd are Apiculturists for the Southwestern Bee Culture Laboratory which is maintained cooperatively by the United States Department of Agriculture and the University of Arizona at Tucson.

A few of the 2,000 colonies of bees used in Yuma County.



The Bee Bee Tree

(Evodia daniellii)

by Fred W. Schwoebel

A TREE that shows great promise as a honey producer but has not, hitherto, had the attention of beekeepers is the Chinese **Evodia,** or Bee Bee tree. It was introduced into the United States as recently as 1905 and is still rare, most specimens being in botanical gardens or on the grounds of a few collectors.

Evodia daniellii, to use the Latin name of the species observed, is a moderately large tree which occurs naturally in North China and Korea. At the Morris Arboretum in southeastern Pennsylvania it blooms the latter half-month of July and into August, over three weeks, and is worked eagerly by the bees during the entire blooming period. Bloom was observed in 1955 from July 14 to August 10. A distinct hum is audible as one approaches the tree in bloom.

Besides blooming at a most opportune time and being worked avidly by the bees, certain facts stand out about this tree which indicate that it could become important to the beekeepers of the eastern U. S. and possibly the rest of the country as well. They are:

It is easily grown from seed. About a hundred seeds were planted in a few spadefuls of ordinary field soil (outdoors) in November, 1954. Other than placing a screen over them to protect them from mice and birds they were given no further attention. Germination in the spring was better than 50%. Almost any beekeeper within its climatic range can grow enough seedlings for his own use, whether on his own land, for distribution among his neighbors, or to plant on wasteland within flight of his bees.

It is an amazingly rapid grower. A specimen placed in the Langstroth Bee Garden at the Morris Arboretum as a seedling at the time the garden was originally planted in 1951 bloomed in 1954 and has outgrown every other tree in the original planting. In late July 1955 it stood at eighteen feet and carried a substantial head of flowers. Of the few printed references that have been consulted, all speak of its vigorous growth. From seed to first bloom is estimated at not more than eight years, probably less. It readily reseeds itself, indicating that, once established, it can be counted on to become a permanent member of our bee flora. Seedlings can usually be found in the immediate neighborhood of a mature tree in garden soil or where the soil has in any way been disturbed.

In addition, it will stand our winters. While the Evodias are generally a tropical genus, **Evodia daniellii** has been found hardy at the Arnold Arboretum in Boston, where at least one specimen has been flourishing for many years.

Flowers of the Bee Bee tree are small, whitish, and borne in clusters about ten inches across. At a short distance these have a greenish-yellowish cast. As many as twenty or more bees may be observed excitedly working a single flower head. Leaves are pinnate and give off an aromatic odor when bruised. They resemble the leaves of a number of our native trees, green ash, Kentucky coffee tree, and black walnut. Seeds are small, shiny black, borne in pods, and curiously resemble, in size, shape and color, the body of an ant with head and legs removed. They mature in October and are attractive to certain species of birds.

The Bee Bee tree has been under the personal observation of the writer for several years and the facts given here are mostly based on that observation. Any statement as to the amount of honey this tree might produce, or its quality, would be a pure guess at this time. His appraisal of its value as a bee plant is subject to revision or confirmation as more beekeepers become familiar with it. Seeds, and a few seedlings, have been placed in the hands of persons competent to make further observations and it is hoped their reports will be available within a reasonably short time.

I believe that more can be done to restore our lost bee pasturage by the planting of nectar yielding trees, than by any other method. Of the trees suitable for such a program the Bee Bee tree appears to be one of the most promising. After all, it is the plants that produce the honey, and without the plants the bees are helpless.

Two views of bloom of the Bee Bee tree at the Morris Arboretum.

Nearby scene of Bohio made into picnic grounds.

Hives were on pipes raised up off the ground, probably to keep out ants and toads.

Looking towards Caribbean side—typical of jungle which now covers Las Cruces trail.

Bees in the Canal Zone - by Albert H. Clagg

READERS will remember an interesting article which appeared in the December 1954 issue of ABJ entitled "Bee Line to California." We note bees reaching California as early as 1852 via the Isthmus of Panama. Evidently these bees were shipped to the mouth of the Chagres River, transported across the Isthmus by the way of the Chagres River and the old Las Cruces trail to Panama City, then again shipped by sea to San Francisco, a feat in those days of fevers, dysentery and jungle hardships. Subsequent shipments of bees are noted with rather disastrous results and when the difficulties that were encountered are considered it is remarkable any bees got farther than Panama.

Much of historical interest has been written concerning the early exploration and settling of Panama by the Spaniards. There are tales of piracy and California gold rush times, of Drake and Morgan looting and burning. The ruins of old Panama, sacked by Henry Morgan in 1671, still stand and are visited annually by thousands.

With the building of the canal and Panama railroad, the jungle was pushed back several miles in many places, but where construction town sites once stood the jungle has quickly taken over and one does not have to go far into the interior to find the natives and Indians living under most primitive conditions. Their means of transportation are the cayuco on the rivers and jungle trails hacked out of the bush on land. The cayuco is a boat or canoe made out of the solid trunk of a tree. This is probably an Indian name. The Spanish name for canoe is "canoa" and for boat "barco."

All that is left of the old route from the Caribbean to the ruins of Panama are the ruins of Fort San Lorenzo and portions of the Las Cruces trail from the village of Las Cruces on the Chagres river. The trail is densely grown over. It had been paved with stones similar to cobblestones which still remain.

Many years ago a railroad conductor and another man, whose name I have forgotten, had a few bees here. Some had come from the States as nuclei and some had been brought from Jamaica in a sailing ship. From this source I made a start in beekeeping at Gatun. After moving to Cristobal my bees improved as there were many cocoanut palms and coral vines in bloom. Only heavy rains interfered with the bees' flight. There were many other sources of nectar, and good crops were extracted which sold readily for about 33½ cents per pound either in 5 gallon cans or glass. We sold mostly to natives.

The bees did not seem to show any of that violent activity we see up north when a good clover flow is on. As the queen lays constantly she slows up in a few months and frequent requeening should be done. Bees have many enemies in the Canal Zone such as giant toads, ants, birds and even an anteater that got its long nose caught in a bee entrance. The quality of the honey, compared to mild clover, was poor. It was light amber, heavy-bodied, but had the flavor of mangoes.

Some interesting results might be obtained by establishing small experimental apiaries over a considerable area. A location south in the vicinity of the town of Chepo as well as one north in the foothills of the Cerro Campana mountains where there is rank vegetation might produce favorably. Towards the prairie country of Penonome we find a different type of soil and plants. Certain seasons of the year might produce bloom similar to our clover bloom up north.

The Last Rites of a Virgin Queen

or

Was She Only Salvaging the "Queen Substance"?

by T. M. Dobrovsky

Potato Investigations Laboratory, Univ. of Florida, Hastings.

AT one of the windows in the morphology laboratory of the Cornell Department of Entomology in June, 1949, was an observation beehive containing a standard size brood comb with young bees. A clear view into the interior was provided by clean sheets of glass enclosing each side. The hive was equipped with shutters made of plywood cut just large enough to cover the entire glass sides when observations were not being made. This colony had been established and placed in the morphology laboratory only a short time previously. It was not supplied with a laying queen at the start, but with eggs, older brood, and young bees. Thus several queen cells had been started during the early days. When the first virgin emerged, she was watched tearing up one of the younger queen cells and killing its occupant.

On the morning of June 22, 1949, I went to work in the laboratory as usual. Before I proceeded with my regular morphological occupation, I opened the shutters of the observation hive to see how the bees were getting along. Soon I saw a young queen walking cautiously on the comb followed by the usual retinue, and that told me that the little colony's queen crisis was over.

On the bottom of the observation hive, near the end opposite the entrance, lay a dead virgin queen. She was assumed to be the former occupant of one of the late queen cells. She was lying on her back, and remained seemingly unnoticed by the bees. It was not possible to determine exactly the length of time she had lain there, but apparently it was not long, judging by the fact that her appendages were limber—they bent readily when bees brushed against them.

After some time, a worker bee left the rushing multitudes, approached the dead virgin, touched her with her antennae, and began to do something to the virgin's thorax with her proboscis. The worker bee was apparently a young one—her own thorax was thickly covered with long light-colored hair. For obtaining a better view, the rest of the proceedings were watched through a large "reading glass."

With proboscis protruded forward and the distal half bent down or posteriorly, the young worker bee touched the thorax of the dead virgin and rubbed forward and backward. These motions were performed rather brusquely in a businesslike manner. The proboscis made contact with the surface of the cuticle and moved among the hairs rather than over them. The contact was made not with the tip of the proboscis as in a process of licking, but with the flat anterior surface of the bent distal half.

In this manner, the worker bee covered the entire thorax. First she worked on one side, then she climbed on top of the virgin and worked on the ventral part of the thorax. Then she went to the other side and rubbed it in the same manner. By climbing over the virgin, the bee made it roll over, exposing its dorsal side. This permitted the rubbing of the virgin's back, also.

After treating the thorax, the bee moved to the narrow waist-like connection between the thorax and abdomen. There she was occupied in the same labors for about five minutes. Then she returned to the thorax to work for a few more minutes.

Then came the turn of the head. For convenience in approach, the rubbing bee climbed on top of the dead virgin, supported herself with her second and third pairs of legs, and held the first pair in the air above the virgin's head, ready to use them as aids when needed. She began by rubbing the mouth parts over and over, now the proboscis, then the mandibles, and back to the proboscis. Finally she descended, stood facing the virgin's head, and began rubbing the compound eyes, the space between them (frons and vertex), and the rest of the "face." And again, as she had done on the thorax, she rubbed with the fore surface of her bent proboscis.

At this juncture the bee took time out after having worked about 40 minutes. She walked a short distance away from the dead virgin, stopped, rubbed her own proboscis with her front legs, rubbed her body, and suddenly, she returned to the virgin and continued working on her head once more. She did that for only a short time—less than a minute—and again stood aside to clean her body.

The rubbing ceremony described above was performed by a single worker bee. However, she was not altogether alone in these operations. Two other worker bees seemed to be taking part as guards. Throughout the entire time rubbing was in progress, one of the guards stood parallel to the virgin queen, about half an inch to the left, with head pointing in the same direction as the head of the dead virgin, while the second guard stood about one inch to the right with body also parallel to that of the virgin and head pointing in the same direction. While these proceedings were taking place in a rather isolated part of the observation hive, many bees wandered by, but the guards pounced upon them, and diverted them away.

Finally all rubbing stopped. The rubbing worker then stepped aside and stood about 1½ inches away. Then one of the guards slowly approached the dead virgin, took hold of her left front wing, and started to drag her toward the entrance of the hive. Promptly a tiny procession was formed: one guard led, the second pulled, walking sidewise and backwards while pulling the virgin; and the rubbing bee followed a short distance behind. At the entrance, the guard flew out carrying the dead virgin away, while the rubbing bee was lost in the bustle at the entrance.

(Please turn to page 485)

How Bees Recognize Numbers and Size

by Dr. E. E. Leppik[1]

Augustana College, Sioux Falls, South Dakota

RECENT extensive study concerning the sensory behavior of insects offers us many new ways of better understanding the delicate life and work of bees. Karl von Frisch and his co-workers have revealed a well developed "sign language" of honey bees (Am. Bee Journ. p. 434, 470, No. 11-12, 1953).

Another phenomenon, described by the writer as "the struggle of bees," shows the reaction of bees to some fatal nerve poisons, now in use as insecticides (Am. Bee Journ. p. 462, 1951).

A further question, however, that arose was: do bees recognize numbers expressed in flowers and if so, in what manner?

A series of tests with honey bees and field observations helped to shed some light on this problem. Following is a brief condensation of some main results, documented in several other papers, such as referred to at the end of this article.

The Form Numerals of Bees[2]

Field observations have shown that bees commonly know if a nectar plant has many, few, 3, 4, 5, 6, 8, 10, or 12 petals and sepals, and how these numbers are arranged in flower types. Experiments with marked bees have confirmed these observations. According to several tests, marked honey bees were able to distinguish different sets of numerals through 12, when these were combined into symmetrical structures like these in fig. 1. Bees did not recognize, however, 7, 9, and 13, although they had a double meaning for 3 and 5. Five was the most favored number among honey bees recorded during these experiments.

Although the perception of numbers by bees seems to be partly covered by their sense for symmetry, in some other points these two behavior patterns differ from one another. A bee is able to distinguish some few objects from one another, even when these are not arranged symmetrically. Furthermore bees are not attracted by those types which cannot be derived from the patterns in fig. 1. It would be appropriate to point in this place to the experiments carried out by Karl von Frisch (1914) and Mathilde Herz (1929). Both behaviorists trained honey bees to select a gentian-shaped pattern (four petals) from a sunflower-type (many ray flowers), but could not train them to distinguish between triangles, squares, and circles. Evidently bees can associate numbers with definite figures, which they can easily perceive and memorize. But they are not accustomed to distinguish geometrical figures in our meaning, when these patterns do not imitate flower parts.

The 'form numbers" of bees like their "sign language" is symbolic. This means that bees can recognize and memorize different symbols which correspond to definite combinations of numbers (Fig. 1). These symbols are expressed in flower types and help bees to locate and recognize their nectar and pollen plants. A flower, however, is spotted as a whole, with all its parts and characteristics, such as size, color, form, symmetry, numbers of flower parts, and odor.

In contrast to the "languages" which are understood by the individuals of the same species, the form numbers of insects are more universal. According to the above-mentioned study, the same basic symbols (fig. 1) were recognized by bees, bumble-bees, butterflies and some groups of moths in several temperate zones and in the tropics.

Apparently this is due to the fact that the above described combinations of numbers (fig. 1) belong to the basic structure of flower types (fig. 2) which have a universal distribution. From this basic floral

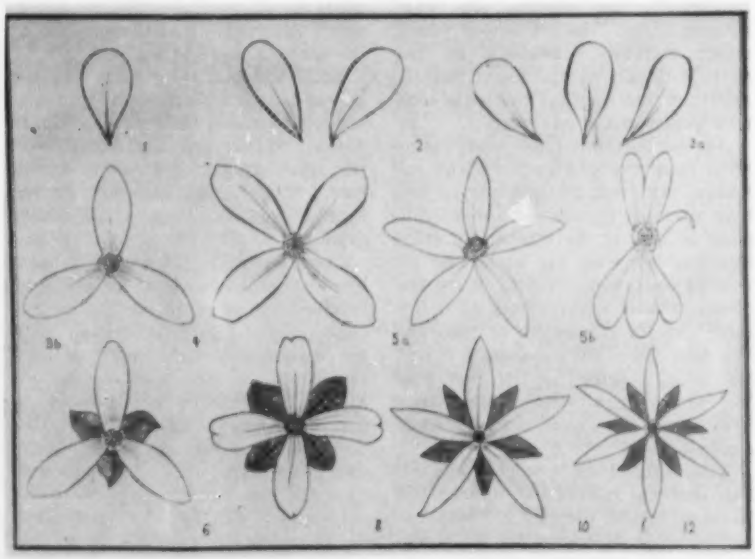


FIG. 1. Symbols for numbers 1-12, arranged into symmetrical figures which imitate main flower types.

1/ This study has been carried on at Augustana College, Sioux Falls, South Dakota, and at the Tropical Research Institute of the University of El Salvador in Central America. The author is indebted to **Dr. Lawrence M. Stavig,** President of Augustana College, **Dr. Aristidas Palacios,** Director General, and to **Dr. Adolf Meyer-Abich,** Curator, of the Tropical Research Institute in El Salvador, for much help during this work.

2/ Use of the expression "form numbers of insects" can be justified so far as the word "language" is applied to the communication of bees. There is substantial evidence that insects cannot "count" much in our way but recognize tri-, tetra, penta-, and poly-merous figures according to the form and arrangement of numbers of these structures (fig. 1). A definite system of such numeral patterns, distinctive to pollinating insects, is expressed in basic flower types.

structure with definite combinations of numbers, the high flower types of upper levels can be derived as pictured in fig. 2.

Perception of Size

Besides numbers, bees and other pollinators are able to distinguish the size of objects. This fact was recorded also by Herz (1933). In rich tropical flora there are blooming side by side numerous flower types which differ only in size from one another. In these cases skilled pollinators very seldom failed to distinguish these plants, evidently according to size.

According to several observations, honey bees, wild bees, bumble bees, butterflies, and some flies were able to distinguish different groups of flowers of the following size:

1. very large, over 2 in. (5 cm) in diameter
2. large, 1-2 in. (3-5 cm) in diameter
3. medium, ½-¾ in. (1.5-2 cm) in diameter
4. small, 3/16-6/16 in. (0.5-1 cm) in diameter
5. micro, less than 3/16 in. (0.5 cm) in diameter

Small insects usually prefer small flowers and large pollinators large types.

Why Bees Need to Distinguish Form Numbers

The life of bees is wholly dependent upon the amount of nectar and pollen the flowering plants offer to them. But the nectar deposits are hidden inside the flowers and cannot be seen from the distance at which insects are commonly looking for food. Besides, many plant species have a special floral structure to protect their nectar deposits against robbers. Some flowers are provided with complicated mechanisms with which the pollinators must be acquainted before they can reach the nectar deposits.

This all makes the search for food a rather complicated business, which in pollinators requires a special skill and a high level of psychic ability. The ability to distinguish numbers is, therefore, a highly valuable advantage for a pollinator. A skilled pollinator can recognize the tri-, tetra-, penta-, hexa-, and polypetalous flowers from a distance. This enables him to save much time and energy. This skill gives to an insect a very definite advantage in the competition with less specialized pollinators.

Summary

Bees and other pollinating insects have been found able to distinguish several combinations of numbers, if these are expressed in symmetrical structures as pictured in fig. 1. Such combinations are the following: many, few, single—five, four, three, two—six, eight, ten and twelve.

These combinations of numbers belong to the basic structure of flower types (fig. 2) and serve beside color, size and odor as pointers for pollinators to find their food plants.

The marked ability of bees to distinguish flower types from one another makes these insects most valuable pollinators and nectar storers. By their amazing behavior in visiting permanently the same plant species, bees secure a successful fertilization of flowering plants with proper pollen. Visiting the same plant species, bees normally store nectar of the same type and quality. This makes it possible for beekeepers to produce and market by proper management pure types of honey that have a higher quality and better price (see Am. Bee. Journ. 1953, p. 471).

References

Frisch, K. V. Der Farbensinn und Formensinn der Biene. Zool. Jahrb. 35, 1-188, 1914. **Hertz, M.** Zeitschr. f. vergl. Physiol. 8,693-748, 1929. **Leppik, E. E.** The ability of insects to distinguish number. The Am. Natur. 229-236, 1953. American Bee Journal 1951, 462-463; 1953, 434-435, 470-471. Several German papers.

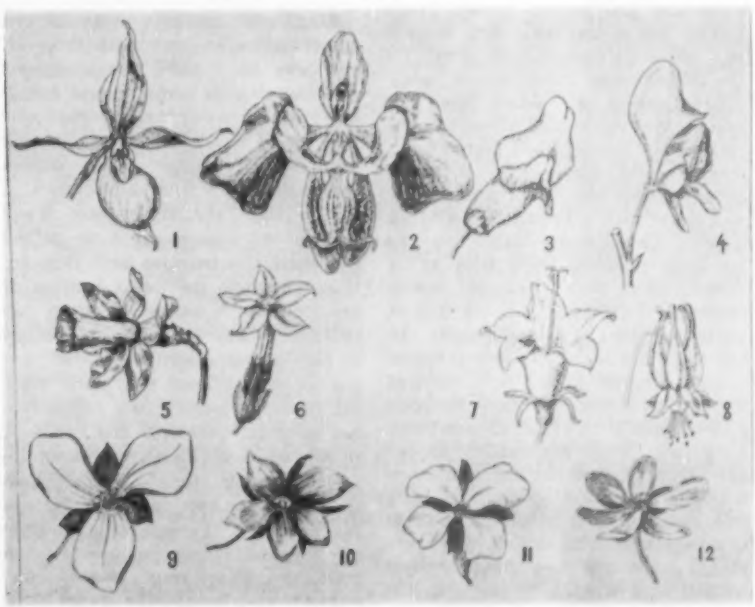


FIG. 2. Combination of numbers and symmetry as expressed in flower types: First row (below): radiate symmetry with definitive numbers. Second row: third dimension is connected with definite numbers. Third row (upper): zygomorphic types of bilateral symmetry.

The "Royal" in Canada . . .

Plans are going forward to make 1955 the beekeepers' best effort at the Canadian Honey Show of the Royal Agricultural Winter Fair. With such keen efforts on the part of the beekeepers, to which is added the fine work of the Canadian Beekeeping Council, no wonder that their domestic crop is insufficient for their needs, and millions of pounds are imported into Canada even over the duty demanded.

While our National Honey show, held last year at Minneapolis in charge of C. D. Floyd and this year at Springfield under Karl Killion, is a good beginning how much better it might be made and how much more attention it would get if held in connection with the International Stock Show held each year in Chicago during December.

No doubt our own Beekeeping Council is cognizant of the possibilities.

Oldest Book Mentioned Bees

Mr. K. N. Dave, in May-June number of the Indian Bee Journal writes of beekeeping in ancient India. He finds that the Rig Veda, religious book and apparently the earliest known written book, contains many notes on the honey bee and its significance in the land at that day.

Multiple Mating of Queen Bees[1]

by Stephen Taber, III

Entomology Research Branch, Agr. Res. Serv., USDA.

THE mating of queen bees has been of interest to beekeepers for a long time. Where do queens mate, with how many drones, and how many mating flights are made before egg laying begins? That we should like to control matings in our queen yards and to supply selected drones for mating makes the problem of economic importance. That matings can seldom be observed makes the problem very difficult.

We have found queen bees to mate with six or seven drones and to mate more than once on one flight. Some queens that were limited to a single mating flight returned with the mating sign but laid no fertile eggs and on examination of the spermatheca had no sperm. Some queens that returned without a mating sign laid fertile eggs. Since these findings are in disagreement with those in most other mating studies, you may well ask how and why we reached these conclusions.

Italian bees of a color mutation called cordovan, which changes all black portions of the body to a shade of brown, were used in our experiments. By artificially mating these brown queens with brown drones we got all brown worker offspring. If we used normal colored or black-banded drones, we got all black-banded worker offspring. If we inseminated a brown queen with sperm from both types of drones, we got both types of offspring.

Suppose we let a large number of brown virgin queens fly in a bee yard well stocked with both brown and black drones. Suppose each queen mates only once. Then worker offspring of each queen will be all black or all brown. The proportion of brown to black drones flying will determine the proportion of queens producing progeny of each color. Suppose that the genetic mutation cordovan influences in some way the adaptibility of the drone to fly or to mate with the queen. Then, even if we had exactly half of each kind of drones in the flight population, we should not obtain a 50-50 chance for each kind to mate with the queen. The drones that mate with a queen may come from anywhere, since we know very little about how far either queens or drones fly.

Several years ago W. C. Roberts, of the Southern States Bee Culture Laboratory, noticed that half his queens returned with two mating signs, indicating that they had mated twice. Let's see what we would get if we flew 200 virgin brown queens in our bee yard with brown and black drones where the black drones outnumber the brown drones 2:1 and 100 queens mated once and 100 mated twice. These figures are hypothetical, and even if true wouldn't happen very often. Of the 100 queens that mated once, approximately 67 would have all black offspring and 33 all brown offspring. Of the 100 that mated twice some would mate with 2 black drones, some with 2 brown drones, and some with a brown and a black drone. Calculations based on the binomial theorem show that 11 of these queens would have all brown progeny, 45 all black progeny, and 44 queens brown and black progeny. In my experiments, of 184 brown virgin queens allowed to fly in a natural way, 13 produced all black progeny and 171 had both kinds. From these data two things are readily apparent. Queens were mating with more black drones than brown ones, and they were mating much more than once or twice. In fact it was estimated that these queens were mating with 6 or 7 drones.

Evidence that queens mate more than once on a single flight was obtained by examining the progeny from 100 brown virgins that were allowed to fly only once in a bee yard stocked with brown and black drones. Of these queens, 39 produced fertile eggs, 4 produced brown progeny, 1 all black, and 34 had progeny of both kinds. If we analyze these data statistically, we estimate that the average number of matings is 4. However, statistically speaking, 39 queens is an inadequate sample for estimating the number of matings.

Three queens returned with the mating sign, but when no eggs were laid their spermathecae were examined and found free of sperm. Three queens returned with no mating sign but laid fertile eggs. The mating sign is therefore not a proof that the mating was successful in getting sperm into the queen's spermatheca.

What does all this mean to you as a beekeeper, especially those of you who have been raising queens and carrying on some type of breeding program using natural matings? In view of available data indicating the mating of queens and drones from colonies 5 to 6 miles apart, it means that our stocks are much less inbred and much more mixed up genetically than we have thought. It means that the usual method of breeding — selecting a queen as breeder because of certain abilities of her worker daughters—is not going to change your bee much after the first few generations. Effective bee breeding is then in the hands of those who artificially inseminate their breeding stock. At this time we have only two recommendations for breeders. Increase the number of drone-producing colonies to the maximum that your locality will support, and isolate the queen yard from other colonies by a distance of 6 to 7 miles.

1. In cooperation with Louisiana State University. A technical report of these experiments is presented in Jour. Econ. Ent. 47(6): 995-998. 1954.

Pollen Loads

The Way the Worker Bee Gathers, Packs and Stores Them for Use.

by Dorothy Hodges

Mrs. Dorothy Hodges trained as an artist at art schools in Hastings and London. She works in water-colour and pastel, has done over two hundred pastel portraits, and has exhibited at the Royal Academy, London. In 1940 she began beekeeping in a small way, partly to supplement wartime rations, and soon became interested in the colours of pollen loads and their variations. She found that existing descriptions of these colours were inadequate and inconsistent, and to remedy this made a record in water-colour of the pollen loads of over a hundred British bee plants. This work took six years and was later supplemented by a series of large-scale drawings under the microscope of 140 of the most important pollen grains. The colour chart and drawings were published in 1952 by the Bee Research Association under the title "The Pollen Loads of the Honeybee," which has been sold in thirty countries.

IT IS one of the joys of a keen beekeeper to stand and watch, even for a few minutes, the activity at the entrance to a hive when the bees are returning from the field with their many-coloured pollen loads. And who is so busy that he cannot occasionally spare time for this? As the poet says—

"A poor life this if, full of care
We have no time to stand and stare."

W. H. Davies.

And how many of us have spared time to watch a bee as she collects and packs her pollen baskets? It is one of the most fascinating activities of which the bee is mistress. The movements take place so fast and are so complicated that the eye finds difficulty in following them.

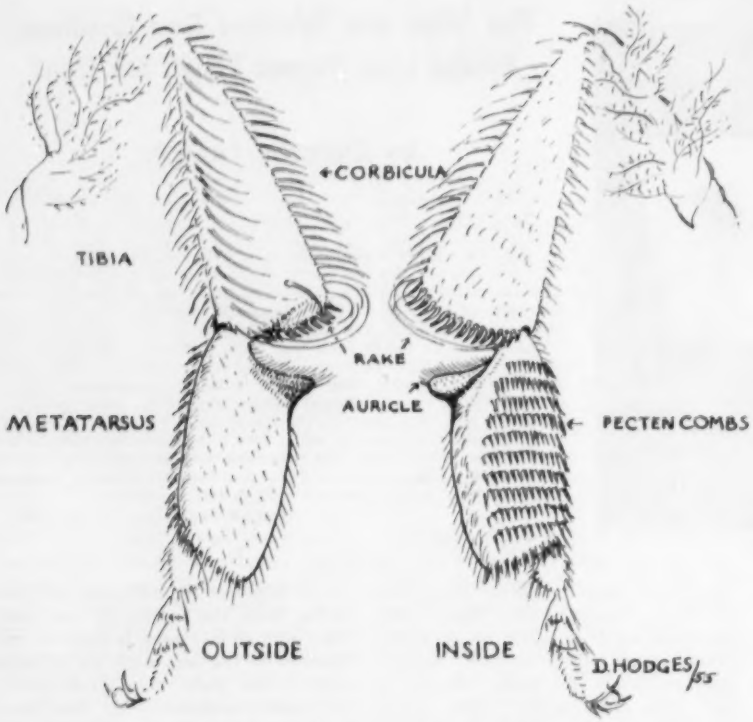
A pollen pellet taken straight from a bee's leg is moist, and can be moulded into shape like dough, whereas the pollen taken by hand from the stamens of the flower is dusty and will not stick together. It was long ago discovered by Sladen and Casteel, working simultaneously in England and the U. S. A., that the bee adds honey or nectar, or both, to make the load. Analysis of a load of Maize pollen showed that twice as much sugar was present in the load as in Maize pollen alone, and that these sugars were the sugars of honey. Nectar may also be used. Ruth Beutler found that all foraging bees, even nectar-gatherers, carry honey in their honey-sacs sufficient for their journey to the crop and back; those going farthest carrying the most honey. But those bees which left the hive to gather pollen carried nearly twice as much honey as the nectar-gatherers, even though pollen-gatherers are known to work nearer home. This is the honey which is mixed with the pollen in packing and is brought home to the hive in the pollen load. What a remarkable observation! For from it we must conclude that the foraging bee setting out on her trip is aware **before she leaves the hive** how far she is going and whether she is going to collect pollen or nectar.

Pollen Packing Process

The bee uses her body as a brush to collect the pollen in her body hairs. The actual process by which she packs the pollen in her pollen baskets is a rapid and continuous sequence of movements taking place simultaneously. The front legs brush pollen from the eyes, the antennae, and the head. The back of the thorax is cleared by the middle legs, and the pollen on the abdomen is swept off by the hind legs. This loose pollen becomes moistened with honey which is regurgitated and conveyed from the tongue by the front legs, and it becomes coated on the brushes of the legs and the plumose hairs of the body. The sticky pollen is passed backwards to the inner metatarsal brushes of the middle legs, which are then held in turn between the metatarsi of the hind legs and drawn forward. This leaves the pollen, now in a sticky mass, loaded into the rows of stiff combs on the inner side of the hind metatarsi. When sufficient pollen is collected there the final action takes place.

At the base of the tibia of the hind legs is a strong rake composed of stiff pectens. This rake is held against the top of the opposite metatarsal combs and pushed downwards, thus raking out all the moist pollen in a compact mass between the rake and the auricle of the opposite leg, called the pollen press. The joint is then closed and the paste-like pollen is squeezed in the pollen press and forced outwards and upwards. Guided by minute teeth on the floor of the auricle and by a fringe of hairs on the edge, it comes to rest on the smooth concave floor of the corbicula or pollen basket. This action, repeated first on one side and then on the other, carries the pollen in small masses from the base of the corbicula in a forward and upward

direction. As the pollen pack gets larger the bee pats and moulds it into shape with the middle legs, and the surrounding corbicular hairs hold the mass, some supporting the sides and some underneath. A single hair pointing downwards on the floor of the corbicula is gradually pushed into a horizontal position, acting as a pin through the middle of the load where it is plumpest. The effectiveness of this apparatus

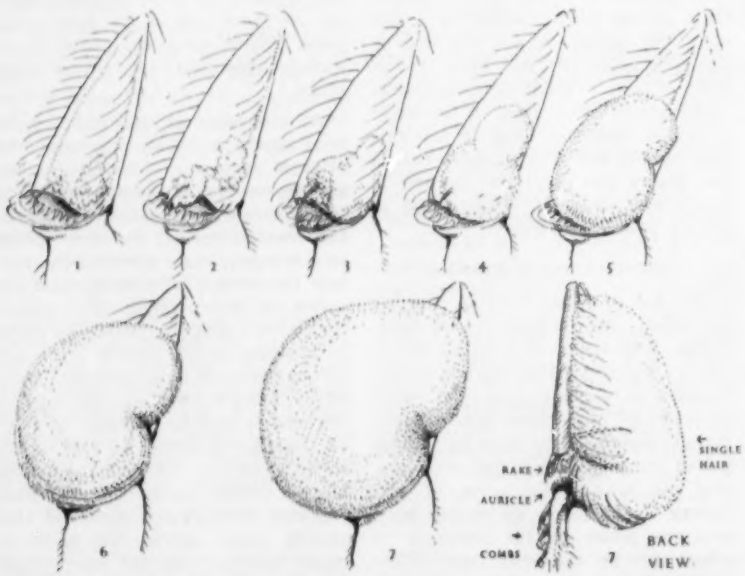


Above: The pollen packing apparatus on the hind legs of the worker bee.

Rake at the base of the tibia of the hind legs.

Below: Back view of the rake in use.

Below: Progressive packing of the load. (Reprinted from "The Pollen Loads of the Honeybee.")



for carrying pollen can be measured by the sight of a bee carying a large load. It seems incredible that so much can be carried safely home.

Behaviour of Bees Gathering Pollen Loads

In some flowers pollen is released in large quantities all at once. This is the case with flowers which are pollinated by the wind, such as poppies, oak, hazel or poplar and single roses. The bee has only to run over the anthers to be covered with pollen all over her body hairs, and then she leaves the flower and hovers nearby while she packs the pollen. In such cases one flower may be sufficient to provide several loads.

But when the pollen in the flower visited is not abundant, as in the case of the clovers, the bee alights on the flower, the weight of her body presses down the keel, and the small amount of pollen is released as the stamens are uncovered—the process sometimes known as "tripping." The pollen is collected by the mouth parts and is passed backward by the legs, mingled with the honey or nectar as previously described; but, in this case the process is carried out while the bee still rests on the flower. In the case of white clover many florets have to be visited to obtain a load—one estimation rates it at 585.

On returning to the hive the foraging bee, if she has found a new source of pollen, will dance on the comb and seek to recruit new foragers to her find. By the dance she indicates to the bees on the comb the direction and distance from the hive. The bees following her in the dance nibble at her pollen loads, and receive the scent of the flower from her body, and from the nectar which she regurgitates; having learned the message they will go out and forage on the same crop.

Having finished dancing, the bee with the pollen loads seeks out one of the empty cells over or surrounding the brood nest. Here she grasps the cell with her front legs, and resting her abdomen on the opposite side, thrusts both back legs into the cell and pushes off the pollen pellets with her middle legs. The loads drop to the base of the cell where they remain until a house-bee breaks them up with her mandibles, adding more honey and possibly glandular secretions. When three-quarters full the cell is topped up with honey and sealed.

The bee packing pollen.

There is no set sequence of foraging activities as was once thought. The needs of the colony at the time determine whether a bee starts by collecting water, nectar, pollen, or propolis. And Ribbands found that some bees collected only pollen all their foraging life. It is only necessary to observe the entrance to a colony of bees just transported and released in a new location, to see how quickly loads of pollen can be gathered. It is astonishing to realize that these bees have scouted round, discovered the flowers, and brought back full loads all in a matter of minutes. Observers who have watched marked bees in the field record the fact that pollen loads are collected more quickly than nectar loads. Park in 1920 found that 40 per cent of bees working maize collected their loads in 6 to 10 minutes, and 97 per cent in under 30 minutes. Ribbands, timing five bees working **Eschscholtzia**, found that the times ranged from 3 to 18 minutes. Weaver, Alex and Thomas watched a bee gather a full load of pollen from sweet clover in 12.8 minutes, having visited 494 florets. By contrast a forager may take up to four hours in poor conditions to collect a load of nectar. Von Frisch observed that there are great differences in the proficiency of individual bees in pollen collecting, some being very much quicker than others, and some scarcely able to pack a load at all.

Foragers on flowers can roughly be divided into three categories, nectar-gatherers, pollen-gatherers, and those which collect both at once. These latter are probably mainly nectar-gatherers which are packing the pollen accidentally collected on their body hairs. Many nectar-gatherers which become dusted with pollen grains in this way take a lot of trouble to free themselves of it. They use their legs in the same way as in the pollen packing process, but the pollen instead of accumulating in the corbicula drops from the base of the hind leg. In this action it must be supposed that the joint of the pollen press is kept closed. The writer has observed this pollen-discarding many times on such plants as lime (**Tilia**), holly (**Ilex**), privet (**Ligustrum**), and scabious (**Knautia**). In some cases this was observed during a heavy nectar flow, and it would seem possible that the bee, in order to carry a maximum nectar load, was removing the extra weight which the pollen would cause her to carry. Some bees were packing pollen side by side with those discarding pollen, so that one must deduce that bees from different colonies were motivated by the needs of their respective colonies. It is

well known that during heavy nectar flows colonies reduce brood rearing, and therefore their need for pollen.

Dusting of Pollen Grains on a Bee's Body

Foragers become dusted with loose pollen grains while foraging on various plants, and these grains play an important part in cross-pollination. Many plants ripen stigmas and stamens at different periods during the life of the flower—thus ensuring that any pollen grains reaching the stigma come from another plant. For in some cases plants are self-sterile. There are some apple varieties such as Cox's Orange Pippin which being self-sterile need the pollen from another apple variety to effect pollination. For this reason Cox orchards are interplanted with a suitable pollinator. The **Labiatae**, or sage family, carry their stamens on the upper part of the flower, and the pollen dusts the backs of the visiting bees. Whereas the **Leguminosae**, or pea family, carry the stamens enclosed in the keel of the flower, so that when the bee alights on this the stamens are pushed upwards and leave the pollen on the underside of the body. In the case of lupins the pollen is dusted between the thorax and the abdomen, and sometimes on the underside of the wings. In the case of clover, the flower being small, the stamens push themselves under the bee's head. In this connection it is interesting to remember the observations of Dr. Minderhoud that bees working white and red clover sometimes return to the hive with the base of the tongue, (chiefly the fossa and postmentum) so clogged with pollen that they perform the so-called "washboard" movements, swaying and moving the head forwards and backwards, in order to convey the pollen accumulated in the neck to the mouth in order to consume it. The dusted pollen on the back of a returning forager is sometimes so noticeable as to make it possible to identify the pollen at sight by the colour and its position on the bee's body.

It is one of the marvels of nature that the plants have evolved their structure in such a way that the visiting bee catches up the pollen in a specific area of her body, carries it to another flower in her normal course of working, and thus effects pollination.

Sizes of Pollen Loads

There is a definite correlation between the size of the pollen load and the species from which it has been gathered. This has been observed by eye, and has now been confirmed by scientists who measured and weighed loads collected in pollen traps. The most obvious example is white clover which is usually carried in rather small loads. Among the pollens studied the largest loads collected have been found to be from charlock, mustard, poppy, horse chestnut, maple and rockrose. And the smallest from white clover, sainfoin, and birdsfoot trefoil.

Times of Day for Collection

The times of the bees' visits to the flowers for pollen are determined by the availability of the pollen in the anthers. Different species release pollen at different times of the day. The bee, having a time sense and a preference for fresh pollen, visits the flowers when the buds open and the pollen is newly released. Weather plays an important part in pollen release, for in damp conditions the anthers remain closed. Examples of flowers which are visited at various times are:

Morning—horse chestnut, Brassicas, poppies, hogweed, white mustard, dandelion.

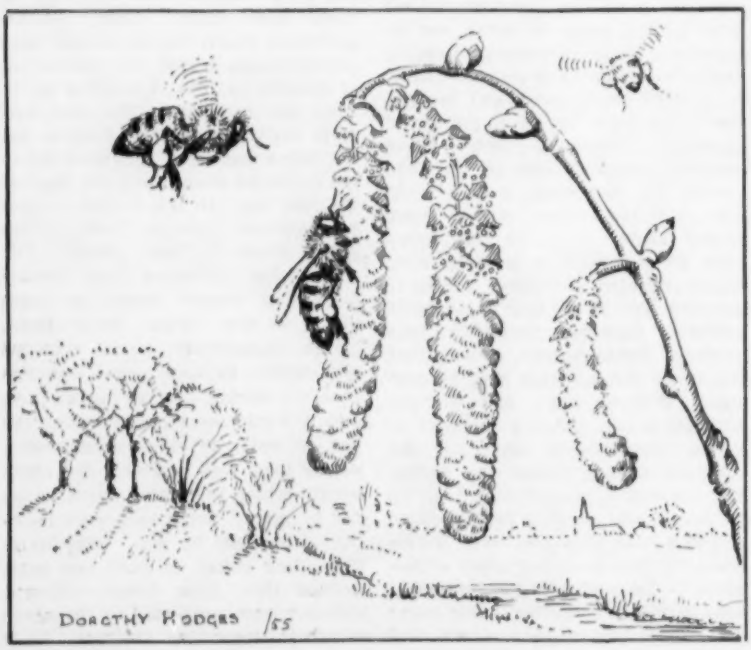
Afternoon—broad bean.

All day—maples, sweet chestnut, willowherb, knapweed, blackberry, raspberry, apples, pears, white clover.

IMPORTANT POLLEN PLANTS

Pollen is gathered early in the year as soon as the temperature and weather allow the bees to fly. At this time the catkin-bearing wind-pollinated forest trees are all-important. Before any other flowers are available these trees provide a vast amount of pollen for bees if they grow within easy reach of the apiary, for at this time of the year bees range only short distances from the hive. These early flowering trees are hazel (**Corylus**), alder (**Alnus**), poplar (**Populus**), elm (**Ulmus**), yew (**Taxus**), ash (**Fraxinus**), and later on birch (**Betula**), beech (**Fagus**), oak (**Quercus**). They are wind-pollinators, relying on air currents to carry the pollen to the small inconspicuous female blossoms, but no nectar is secreted. The willows (**Salix**) are even more important bee trees, for not only do the catkins yield pollen copiously on the male trees, but both male and female trees secrete nectar. The various willow species grow easily from cuttings, and many beekeepers plant them near their apiaries for their great value to the bees. It is early pollen which enables the bees to build up and supply their ever-increasing brood nest, and so provide the large force of bees needed for the nectar flows. When spring is succeeded by the main flowering season the number of flower species

Early spring pollen.



available is great, and then the bees have to choose between them.

How is this choice exercised? It is well known that bees have preferences, and that they work some plant species exhaustively and neglect others entirely. Precise information on sources of both nectar and pollen has been obtained in various European countries by means of pollen analysis. The usual method adopted has been to fix pollen traps to the hive entrances; these consist of wire mesh or punched plastic screens through which the returning bees are compelled to clamber. In the process the pollen loads are knocked out of the corbicula, and the pellets fall through a larger mesh screen into a trough beneath. The troughs are emptied at regular intervals, usually daily, and after thorough mixing, a sample is taken of the contents. The sample is sorted into groups by colour, size and shape, and the grains of each group are then identified under a high-power microscope.

Results of research on these lines have been published in England, France, Sweden and Switzerland. (As far as I know no comparable work has yet been published in the U. S. A.). All these reports agree in one conclusion, that by far the greatest amount of pollen is collected from relatively few species, among the many which are available to the bees, and **that these few are usually found among the agricultural crops of the country,** though the forest trees and some important weeds are exceptions. Of course it must be borne in mind that each locality has its own wild flora and its own crops, and no two districts are exactly alike; this is demonstrated by Maurizio's results from three places in Switzerland.

As long ago as 1908, Miss A. Betts started to investigate pollen loads. Her method was to catch bees on the alighting board, observe the pollen load, and examine samples of each colour under the microscope, paying special attention to any which appeared to be "mixed," that is, two different coloured pollens in one load. This method of counting loads by colour at the hive entrance was adopted by Percival (1947) during her four months' observation. The disadvantage of this method is the prodigious task involved, and the possibility of error due to colours not being constant, and to the similarity of some pollen load colours from different origins.

The other papers on pollen collection referred to are by A. D. Synge (1947) working at Rothamsted—two colonies side by side for two seasons; A. Maurizio (1949 and 1953) working with two colonies in three places in Switzerland, Liebefeld, Davos and Wadenswil; Louxeaux (1954) working in France near Paris with five colonies in one place; Schwan and Martinous (1954) working at Ultuna, Sweden.

All these workers found that colonies placed in the same apiary collected different proportions of the available crops. Louveaux was able

IMPORTANT POLLEN SOURCES IN EUROPE

	EARLY SPRING	SPRING	EARLY TO LATE SUMMER		AUTUMN
PERCIVAL Radyr WALES 1945	No record	Hawthorn Broom	White Clover Blackberry Raspberry	Charlock Willowherb	No record
SYNGE Rothamsted ENGLAND 1945-1946	Ash Poplar Elm	Hawthorn Fruit trees Pyrus & Prunus	Sainfoin Red Clover	Charlock White Clover	Mustard Ivy
MAURIZIO Liebefeld SWITZERLAND 1950-1951	Elm Willow	Dandelion Willow Beech	Grass Plantain	Poppy Maize	Maize
MAURIZIO Wadenswil SWITZERLAND 1950-1951	Yew Elm Poplar	Fruit Trees Pyrus & Prunus Dandelion	Grass	Plantain	Plantain Maize
MAURIZIO Davos SWITZERLAND 1949-1951	Alder Erica carnea	Crocus albiflorus	Dandelion Trollius Europaeus	Rockrose	Willowherb
LOUVEAUX Bures-sur- Yvette FRANCE	Poplar Mistletoe Hazel Willow	Fruit Trees Dandelion Rape Bluebell Beech	Rape Oak Crimson Clover Comfrey	Charlock Tulip Tree Poppy Sweet Chestnut	No record
SCHWAN and MARTINOUS Ultuna SWEDEN 1946-1952	Coltsfoot Willow	Dandelion	White Clover Red Clover	Cornflower Wild Chrys- anthemum Camomile	No record

to demonstrate this further by comparing day by day the yield from pollen traps on five hives. No two colonies gathered the same proportions of the flowers available; and each colony had its own formula peculiar to itself, both in the numbers of species worked and in the quantity from each. Thus some colonies worked a few species only, while others worked many different species in small proportions. Some colonies were quicker than others in discovering a new forage source and exploited it to the full; others were slower in discovery and only worked it sporadically.

Louveaux was also able to show that a colony may develop a "taste" for certain pollens, not only for one species but for other species of the same plant family, **Cruciferae** for example. (This might account for the theory held by some commercial beekeepers, that when moving colonies to pollinate particular crops for seed the colonies should be placed far from any species on which they have been accustomed to work; otherwise the new crop may be ignored). The harvest from the five colonies was in some cases in agreement; this was shown in the case of the major pollen sources, disparity showing more clearly in the secondary sources.

It is difficult to compare the results of these investigations directly. Partly owing to the differences in seasons, owing to the different latitudes, and partly because the various investigators have assessed their results in different ways. However, by approximating the seasons, I have attempted to present a comparison of those species which have been listed by the various authors as of the highest importance.

It is noteworthy that in early spring everywhere the catkin-bearing trees are of vital importance. The only other plants listed are mistletoe in France and coltsfoot in Sweden. In spring it is the fruit trees, **Pyrus** species, apple, pear, **Prunus** species, cherry, plum, almond, hawthorn,—and of universal importance the common weed dandelion. In summer it is the agricultural crops which prove to be the most important, not only for nectar but also for pollen, and the clovers head the lists. In Switzerland the native flora of the meadows is favoured for cattle, and the clovers are not grown as a special crop. However white and red clover are listed as of secondary importance. For this reason meadow grasses and maize, which is grown commercially, head the list for pollen importance. Neither of these yield nectar however.

For Europe then the leading bee plants for nectar and pollen belong to four plant families:

Leguminosae or clover family—white, red, and crimson clover, beans, robinia, birdsfoot trefoil.

Rosaceae or rose family—fruit trees. raspberry, blackberry, hawthorn.

Cruciferae or cabbage family—rape, mustard, charlock (a weed).

Compositae or daisy family.

Mixed Pollen Loads

The constancy of the bee to one plant species during one foraging trip has been recognized since the days of Aristotle. In the experiments mentioned the research workers were able to confirm this ancient observation by more accurate means. By counting the loads found to be composed of more than one species of pollen grains they were able to state the proportion of mixed loads found. The following figures have been given:

Betts—Probably not more than 3 per cent.

Maurizio—1 to 3 per cent.

Percival—0.2 per cent.

Schwan & Martinous—0.1 per cent.

The mixing of pollen loads by the bees has been attributed to various causes: species growing intermingled and of the same height; scarcity of pollen available at the time; testing out new crops while still working the old. All these causes may play their part but it seems that a few bees only are responsible, and that they may mix pollen from tall trees with daisies for example, and main crops with insignificant ones. So let us say that a few bees behave in an eccentric way at times, but that in the main foraging bees work only one species of plant for pollen during one trip.

IDENTIFYING POLLEN LOADS AT THE HIVE ENTRANCE BY COLOUR

Watching bees carrying in their many-coloured loads leads inevitably to the question, from what flowers have they been gathered? Many people have tried to describe these colours in words. But it is very difficult or even impossible to convey to others, in words, an impression of colour. Reiter in the U. S. A. (1947) was the first to record the colours by matching the pollen loads to an existing colour chart, "The Dictionary of Color" (Maerz & Paul). This is a good method of recording if only there existed a universally accepted chart of sufficient range and easily available to all for reference. Unfortunately there is as yet no such chart. Early in 1946 the present writer started to make recordings of pollen load colours from all the main pollen plants of England, as well as many of those which though not important are useful to bees. The method adopted was to find bees working each crop, catch them either by the wings or in cages, remove the pollen pellet, release the bee, and record the colour immediately by means of water-colour paint. It was found necessary to record the colour from pellets taken from several bees, because different shades of the same colour were frequently seen, which confirmed Reiter's findings. Six seasons were spent in carrying out this work, and a colour chart was compiled. The plants are arranged in this chart in order of flowering, so that those which flower simultaneously are found together. Altogether 120 bee plants are represented, and in most cases three shades of colour are given for each plant. This chart can be used as a guide to the identification of pollen loads at the hive.

Experiments were carried out at Rothamsted by the writer to determine the cause of the variation in colour found between pollen loads collected from the same plant species. Hand-collected pollen gathered from catkins of poplar and hazel was used to make "artificial" pollen loads. Accurately weighed samples of pollen were mixed with equal quantities of dark honey, light honey, nectar, and sugar syrup, and recorded in colour in the same way as natural pollen loads. The results showed that the colour of the mixing material used by the bee, and the amount used, caused variation in the colour of the resulting artificial pollen load. From this we see that each bee, when loading up before her foraging trip, may influence the colour of her pollen load by taking honey from a comb containing dark or light honey, or newly gathered honey, or by mixing her load with nectar gathered from the flower as she works. It was found when recording natural pollen loads from bees working **Prunus** that the lightest and brightest colours were being

carried when the flowers had newly opened and the bees were working the flowers for nectar as well as pollen. The colour of pollen and the colour of the anthers must not be confused. For instance, the anthers of the pear are red but the pollen is greenish-white. But the colour of the pollen load from pear is green because of the mixing material used by the bee.

The accuracy of identifying pollen loads at the hive is complicated by the fact that many plants flowering simultaneously yield similarly coloured pollen, especially the yellows and greens. Other colours are conspicuous and the source may be identified with more assurance. But the scientist in his laboratory relies not on colour alone but on the size, shape and character of the load, and uses a high-powered microscope to confirm his identification.

POLLEN GRAINS

Pollen grains are very small indeed and can only be seen properly under a high-power microscope, the usual magnification required being x 600. They vary in size according to the different plant species, from 4 to over 100 microns, and there is a likeness between pollens in each plant family. Some are plain in shape and smooth in texture; others are exquisitely sculptured into spines or reticulations. No black and white picture can convey their beauty; they are like faintly tinted gems when seen unstained under the microscope, though without magnification they appear just like coloured dust.

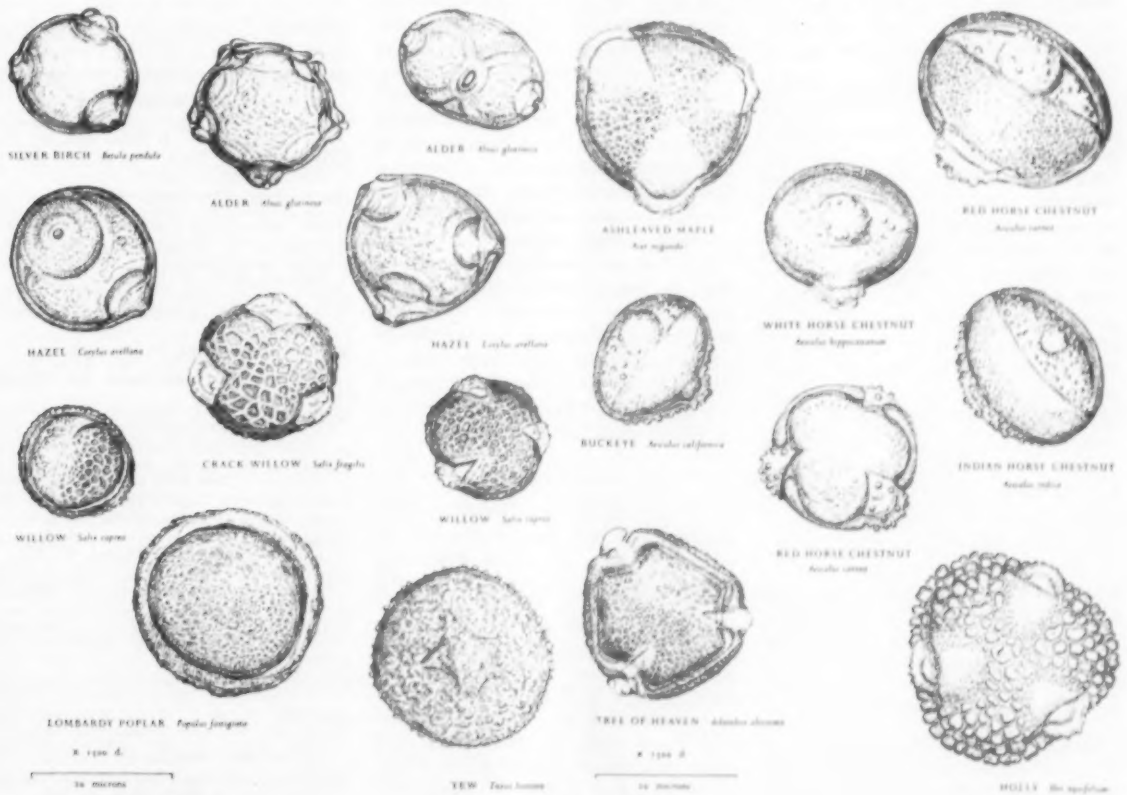
For anyone with time and suitable facilities I would recommend the study of pollens. Many happy hours can be spent in building up a collection of microscope slides of the pollens of all the bee plants of the district. These pollens can then be sought for in honey, and pollen loads in pollen traps can be identified. The International Commission for Bee Botany has drawn up standard methods for preparing pollen grains and this is given below. The results of all the writer's work were published in book form in 1952 by the Bee Research Association under the title "The Pollen Loads of the Honeybee." Many of the plants represented in this book are of course common also in North America.

THE USE OF POLLEN IN THE HIVE

It has been estimated that a colony of bees may consume from 50-100 pounds of pollen in a year. The exact amount is difficult to assess, because when a pollen trap is fitted to a hive and the contents weighed, this does not correspond to the consumption of pollen by the colony. Deprived by the trap of much of the pollen collected, the bees tend to collect more in order to make up the amount required. Pollen is referred to as "bee bread," presumably because of the dough-like consistency of the pollen load. This is a misleading name, implying that pollen is a carbohydrate food as bread is to humans. It is of course the honey that provides the carbohydrates in the bee's diet. Pollen could more aptly be called "bee meat," for it is the bee's source of protein, as well as vitamins, fats and minerals.

How is this pollen used? All young larvae are fed with a special

Pollen grains. (Reprinted from "The Pollen Loads of the Honeybee" by kind permission of the Bee Research Association.)

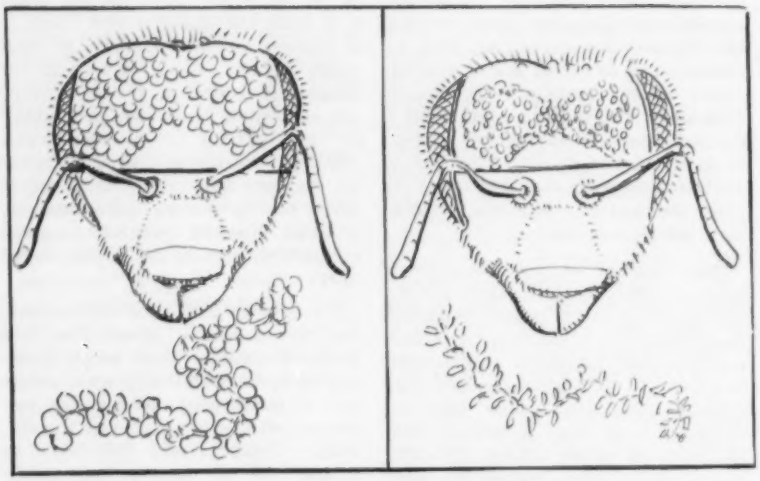


brood-food or "royal jelly" for the first three days of their life, and thereafter with pollen and honey. Royal jelly is a secretion from glands in the heads of nurse bees called the pharyngeal or brood-food glands. A baby bee soon after emergence eats large quantities of pollen, and when she is about five days old these glands become fully developed, and she is then able to feed the brood. Not only are these glands developed, but so also are other cells in the abdomen called the "fat body," which are capable of storing protein and fat. As the bee continues to feed the brood these glands gradually become exhausted, and the bee passes on to foraging, and is not again capable of rearing brood.

The bees emerging in autumn eat pollen, and their glands develop and remain in this condition throughout the broodless winter period, ready and able to rear the early brood long before new pollen can be collected. Therefore beside the pollen stored in the comb, which is vitally important to every colony, there are these "winter bees," with long lives lasting several months (as compared with the short lives of several weeks for the summer bees). Winter bees can thus be regarded as storehouses of the vital brood food, ready and waiting for the first eggs to be laid.

Researches have been carried out by Dr. Maurizio over many years on the effects of pollen feeding on newly emerged young bees. Queenless bees on a single comb kept in an incubator were fed with pollen in candy from many of the bee plants, in various concentrations. The bees were examined at different intervals, and the effectiveness of the pollens in developing the pharyngeal glands, fat body and ovaries was assessed. The results show differences in nutritive value of the pollens studied (and also of the pollen substitutes). The most important constituent proved to be protein, the vitamins having little effect on gland development. Delay in feeding pollen until the eighth day had an adverse effect on gland development, and if withheld until the sixteenth day after emergence, not only did the glands fail to develop but the bees died early. It was shown that there is a direct relation between pollen feeding and the length of life.

Experiments with marked bees in both queenright and broodless colonies showed that in breeding colonies



Brood-food glands (front of head removed). Left—Fully developed glands in young bee after pollen feeding. Right—Exhausted glands in old bee. (Partly from Maurizio 1954.)

60 days was the maximum life of a bee in summer; whereas in broodless colonies the maximum life was 188 days. The length of life of marked autumn-bred bees with fully developed glands was from 215 to 233 days in a normal colony. Dr. Maurizio's researches also include investigations on pollens which are poisonous to bees. These include some members of the buttercup family (**Ranunculaceae**) and also horse chestnut (**Aesculus**) and lime (**Tilia**). Horse chestnut poisoning is well known in California from **Aesculus Californica,** and sometimes occurs in Switzerland and England. The poisonous substances were found to be saponin and aesculin, the most harmful being saponin. Ten per cent of horse chestnut pollen fed to bees in cages proved fatal. Brood can also be affected. Poisoning from these sources only occurs when conditions are such that a colony is forced to consume too high a proportion of these pollens for lack of alternative sources.

CONCLUSION

The results of these investigations demonstrate how vital is the role of pollen in the life of a honey-bee community. From them we learn how essential it is that colonies should be placed within easy reach of good pollen sources, paying particular attention to catkin-bearing trees in early spring. In autumn not only is it important to see that the bees have plenty of honey, but also that they should have good stores of pollen, and plenty of young bees with their glands fully developed. On these conditions depends the successful wintering of the colony, and that in turn sets the seal on a good honey-producing colony in the following season.

References

BETTS, A. D. (1935) The constancy of the pollen-collecting bee. **Bee World** 16: 111.

BEUTLER, R. (1930) Time and distance in the life of the foraging bee. **Bee World** 32: 25.

CASTEEL, D. B. (1912) The behavior of the honey bee in pollen collecting. **U. S. Bur. Ent. Bull.** No. 121.

ECKERT, J. E. (1933) Buckeye poisoning of the honeybee. **J. Econ. Ent.** 26: 181.

HODGES, D. H. (1952) The pollen loads of the honeybee.

LOUVEAUX, J. (1954) Etudes sur la recolte du pollen par les abeilles. XVth Int. Beekeeping Congress, Copenhagen.

MAURIZIO, A. (1945) Vergiftungen bei einseitiger Tracht von Rosskastanien. **Schweiz. Bztg.** 65: 524.

MAURIZIO, A. (1953) Weitere Untersuchungen an Pollenhöschen. **Schweiz. Bztg.** Beiheft 20.

MAURIZIO, A. (1954) Pollenernährung und Lebensvorgänge bei der Honigbiene. **Landwirtschaft Jahrbuch der Schweiz** 68, Heft 2.

MINDERHOUD, A. (1954) The direct pollen consumption by the honeybee. XVth Int. Beekeeping Congress, Copenhagen.

PARK, O. W. (1949) Behavior of pollen gatherers. **The Hive and the Honeybee.**

PARKER, R. L. (1947) The collection and utilization of pollen by the honeybee.

PERCIVAL, M. (1947) Pollen collection by **Apis mellifera. New Phytol.** 46: 142.

REITER, R. (1947) The coloration of anther and corbicular pollen. **Ohio J. Sci.** 47: 137.

RIBBANDS, C. R. (1949) The foraging methods of individual honeybees. **J. anim. Ecol.** 18: 47.

SCHWAN, B. and MARTINOUS, A. (1955) Studier over binas pollendrag i Ultuna.

SLADEN, F. W. L. (1911) How pollen is collected by the social bees and the part played in the process by the auricle. **Brit. Bee J.** 39: 491, 506.

SYNGE, A. D. (1947) Pollen collection by honeybees. **J. anim. Ecol.** 16: 122.

Bee Culture in Mexico

by Malcolm Scott Hallman

CONTRARY to common belief, beekeeping on this continent did not begin with the settlement of New England. It is true that our northern aborigines were unacquainted with bees until after the English came, but south of the Rio Grande bees had been domesticated centuries before the Spaniards arrived in 1519.

VERA CRUZ

Among the first native beekeepers encountered by the Spaniards were the Totonacs who lived along the gulf coast north of the present city of Vera Cruz. Bernal Diez, in his "The True Story of the Conquest," tells of wax candles being made by the natives at Cempoala; in fact, the present inhabitants of this region are called the Tajin Totonacs, meaning "three beehives." Here, as in ancient times, bees are kept in five or six foot lengths of bamboo, in hollow tree trunks or in earthenware jars. A few Old World bees have recently been introduced and they are housed in box hives. The former colonies are called **colmenas** and the latter **enjambres.**

Two kinds of native bees are found here; one at least has been domesticated because new colonies have been brought forth from time immemorial. This type is called **colmenas real** or in the Totonac dialect, **tasgat.** The other is called **koamekas** and has no stinger whatever. It is rare and is seldom found in modern bee yards. The Old World bee is associated with death. If one goes to a wake, he should bathe before approaching their hives lest the bees leave. This myth may have some remote connection with the old New England tradition of "Telling the Bees," inherited from Old England and celebrated by the poet, Whittier. To soothe them, a black cloth as a sign of mourning is placed on the hive or two or three crosses are marked on it with soot. It is also prudent to bring a candle from the wake, break it into short lengths and put several lighted ones on the hive.

In the tropics, Old World bees have three swarming seasons a year. The Totonacs, as did our forefathers, believe in making a noise to settle a swarm and consequently beat gasoline cans. Before the discovery of oil in this area they beat snakeskin drums. When a swarm is about to be hived, the new home is made attractive with copal incense or brown sugar sirup. Once hived, the bees are shut in for five or six days until enough comb is built to discourage their leaving. If the bees are cross a smudge of corn cobs is made inside a pottery container to pacify them.

A candle of wax from native bees still plays a prominent role in native ceremonies, especially associated with birth and death. The wax of the Old World bee is not acceptable as a substitute. Candles from the latter, however, may be used on the altar in honor of a Christian saint and they are generally used in Catholic ceremonies, especially purification rites in the course of which the body is stroked with them. This is a typical case of the mixture of heathen and Christian worship in religious practices throughout Mexico today.

The "Old Man of the **monte**," who is said to control the destiny of game animals, is also the "chief" of the wild bees. Among early tribes of this area, the bee hunter takes this charge as his guide, "When you go to hunt for bee trees, do you speak first to the 'Old Man' and do you give food to the idols which are in the forest?" Today, the Christian saints have even invaded the heathen domain for it is said that Saint Lawrence is in charge of wild bees. The canny Indian slyly appeases both!

Bee trees are cut, water sprinkled on the gashes, no smoker or veil is used and the log or bamboo stem is carried home to hang on the side of the hut where it will not receive the direct rays of the tropical sun.

There is also a third type of native bee, **cuamin**, larger than either of the other two and armed with a long stinger. These are not brought home when a tree is cut, but the honey and wax are taken in wooden trays. Two gallons of honey is considered a fair take and it has a distinctive taste not highly regarded. This small production and poor quality of honey probably accounts for no attempts to domesticate this type.

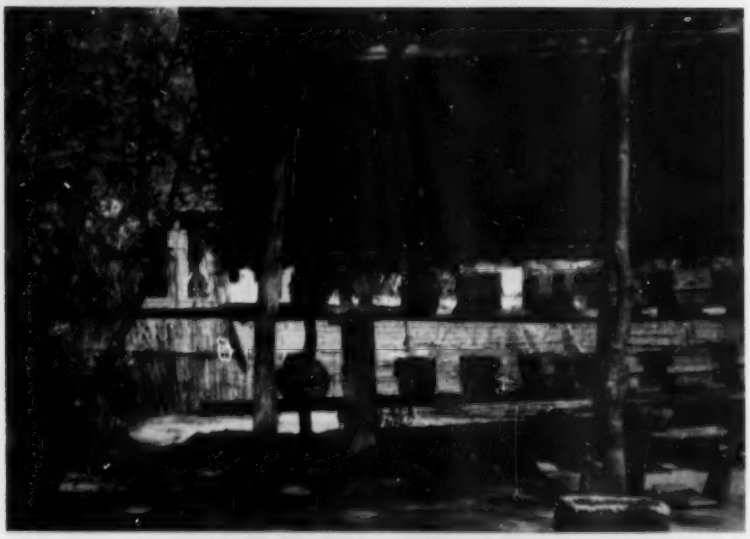
The removal of the honey in the home bee yard is known as "castration." Some natives "castrate" every year, but most every other year, generally in October. However, if a neighbor needs honey urgently for medicinal purposes, a beekeeper usually is willing to open a colmena except in very cool weather. For Old World hives the smoke of a cigar is used during "castration."

Although native honey is eaten for "pure pleasure" with a special bread —**pan de agua**—flour and salt, no egg, the consumer is liable to run a temperature on this "hot food." Unboiled honey mixed with alcohol is taken as a tonic during pregnancy. Tea honey, **yerba dulce**, is drunk to relieve menstrual pains. Both sexes take it to relieve belly ache. For women it hastens slow parturition. In case a mother does not have milk at once the baby is given a honey soaked rag to suck. This has been known to keep a baby alive for a month.[1]

Earnings from the sale of honey are supposed to be used for clothing or food—never for vices. Conduct of beekeepers affects profits. A couple that quarreled, although they worked hard had no success, but when they were reconciled, their hives became profitable. A man who went to market and got drunk from the sale of his honey found all his bees gone when he came home! It might be well if some of us checked up on our behavior some seasons.

YUCATAN

The Maya beekeepers of Chiapas and Yucatan were next encountered by the Spaniards early in the fifteenth century. Their bees were a stingless variety which produced a fine clear honey made from a species of jassamine—a white blossom profuse in September. Here in the far south honey was taken six times a year. The best take was in November, the end of the rainy season. Wax was important in prehistoric times as well as after the conquest although religion played a part in



creating a greater demand during the last four hundred years.

Beehives are still made from sections of hollow logs with mud stoppers at the ends. The doorways are small holes cut in a depression and usually marked with a cross. Honey was and is still eaten with tortillas and used as a sweetener for drinks. Wax was used for candle making and also in attaching a ball of it to extract an imbedded tick.

CHIHUAHUA

Among the high mountains of this state live the Tarahuamaras where beekeeping of the most primitive sort still persists. Bees known as **Kolomela,** are highly respected. If they are found drowning in a jar of honey, they are rescued because they are "children of **Tata Dios,**" Daddy God. Honey and wax produced here are both used in ceremonies held in honor of the dead. The bee is also respected as a worker because industry is a Tarahuamara virtue, whereas laziness is a sin very low in the social scale.[2]

When wild honey is found in a hollow tree, the tree is cut down. Then the Indians approach the stores quietly and take the honey out with their hands, carefully avoiding any striking motions. They do not use smoke as they do not wish to offend **Tata Dios.** The early Jesuits, observing the meager product of the little native bees, tried to introduce Italians, but with no success. They still cherish the children of **Tata Dios** and as their forefathers have done from time immemorial, thus address them when taking honey—"I, who come to do this unfriendly act, come compelled by necessity, since I am poor and miserable; thus I come only to seek my maintenance and so let none of you be angry or be afrightened of me. I am only going to borrow from you so that you can find favor with my sister the goddess Xochiquetzal, she who is called 'Precious Branch' your friend."[3]

As in so many instances, beekeeping in Mexico today is in striking contrast to the primitive practices among the Indians. Within a few

●

Top—Beeyard of Crucofero Mendoza in village of Tetecala, Morelos. Both round and square hives are about a yard long and can be opened at either end and the bees smoked back to facilitate the taking of honey.

Center—Front view of the same yard showing spacing of hives. Because of the heat of a January day these bees were "hanging out" on the front of the hives.

Bottom—View from the same yard showing two cylindrical hives, one on the middle shelf and another on the extreme left of the lower.

hours' drive one can see the most up-to-date bee culture in one of the many modern apiaries and an ancient yard in a small village or on a lonely mountainside. In the state of Morelos one beekeeper alone has a hundred and seventy-five expertly managed yards and exports his honey to many parts of the world. He has an excellent library on bees and flowers, a plant equipped with the most modern machinery for handling honey and wax and manufacturing bee supplies. On the other hand, one can find an old man or woman tending a few log hives or cylindrical hives of yard long sticks daubed with mud and lying on their sides under a crude thatched roof.

Among the modern beekeepers, the industry has recently taken a most unique turn; some of the big producers of honey and wax have converted their yards into centers of royal jelly production. In fact the medicinal use of the food of queens has become the rage. Physicians are prescribing its use and druggists are promoting its sale. Men in other lines of business are switching to jobs as salesmen of this miraculously advertised elixir. Inasmuch as it is sold for several thousand pesos a pound its use at present is limited.

At the state fair last winter one producer of royal jelly distributed leaflets describing how the bees make it, how it is processed for sale and claimed its usefulness for "relieving weak and tired eyes, increasing vigor and physical strength, helping women in the critical period of life, rejuvenation of the aged, banishing fatigue, restoring hair to the bald, curing arthritis and gout, renewing the power of memory and restoring sexual energy." In spite of the fact that scientists who have dealt with this subject have not yet said the last word, this new business is booming. One big apiarist even sent a supply to the Pope during his recent illness.[4] Which one of the above afflictions was the cause of his disability or whether royal jelly was responsible for his recovery the press story of this news did not state, but this information is passed on to progressive beekeepers, ailing dignitaries, and baffled physicians for what it is worth!

1. Kelly and Palmer.
2. Bennett and Zing.
3. Thompson.
4. **"Recibio Su Santidad El Papa La Jalea Real Enviada De Mexico,"** TODO, La Mejor Revista de Mexico - Issue of March 11, 1954. (receipts by His Holiness the Royal Jelly sent from Mexico) Title of article published in the Magazine "Everything" the biggest news magazine in Mexico.

Honey and Your Diabetes No. 9

by D. C. Jarvis, M.D.

AT this time let us consider a patient showing 5 per cent of sugar in the urine each day and note the effect of increasing the daily intake of potassium in accordance with the belief of Vermont folk medicine that diabetes mellitus is due to a lack of a proper daily intake of potassium foods.

This patient is a married woman, aged 45 who is 5 feet 8¾ inches tall and weighs 205 pounds. On November 9th this patient came to the office and stated that on October 31st she drove her car 30 miles to visit a relative. On the return trip to her home she developed double vision which made it necessary to keep one eye closed in order to drive home. It was learned that diabetes mellitus had been present for 13 years. The patient had been taught how to test her urine for sugar and did so each day. As a rule each daily test showed the presence of 5 per cent of sugar. She did not take insulin but did follow a diabetic diet. Chronic fatigue was present each day which she tried to control by having a nap each afternoon and going to bed early at night.

In order to increase the daily intake of potassium the following three were prescribed. One teaspoonful of apple cider vinegar and one teaspoonful of honey in a glass of water at each meal and one kelp tablet at supper each day. All three of these are a source of potassium.

November 15th she reported that the double vision had lessened 50 per cent. She had more energy and has not found it necessary to lie down afternoons for three afternoons. Sugar in urine had dropped from 5 per cent to 2 per cent.

November 29th patient stated her double vision has disappeared. Her urine, with the exception of two days, had shown only a trace of sugar since her last office visit. On these two days the urine showed the presence of 2 per cent of sugar. She no longer found it necessary to lie down each afternoon or to go to bed early at night.

On December 23rd patient came to the office and stated she did not have double vision in any position of her head. Urine when tested each day for sugar showed the presence of a trace to one per cent. Patient was directed to continue the daily intake of potassium in order to control the presence of sugar in the urine.

Last Rites of a Virgin Queen—

(Continued from page 471)

Many times since I wrote the notes of the above proceedings in 1949 have I asked myself what, if anything, does all this signify. Is it a characteristic behavior associated with the disposal of dead queens? Or is there something more profound involved? If it is only the "last rites" given a queen before her disposal, is such treatment given all dead queens, or only virgin queens, or only some queens at random? If all queens get it, is it given a strange queen which may be killed in a hive after unsuccessful introduction or only to queens raised in the same hive?

Now that there is a theory on "queen substance" (Butler, 1955)[1] we may ask whether or not the rubbing bee was collecting queen substance during her extensive operations? But that raises other questions, mostly ones of doubt. If she actually was, why did the guards keep other bees away and not allow them to participate or to come and be given some queen substance? Why was the proboscis bent ventro-posteriorly and only the anterior flat surface used in the "rubbing"? Why was this method used exclusively? Since the normal source of queen substance—a mated queen—was already present in the observation hive, is it possible that there is a time or occasion when two sister queens raised by the same colony at approximately the same time, can produce identical queen substance?

We can go on speculating and asking questions indefinitely. But that will not prove any point we may raise, nor will it focus our attention on the truth regarding the nature of the little drama we watched in the observation hive in the morphology laboratory at Cornell. Perhaps someone will furnish the answers some day.

1. Butler, Colin G., 1955. The role of "queen substance" in the social organization of a honeybee community. Amer. Bee Jour. **95**(7): 275-279.

Canadian Exhibit . . .

This is a picture of the Canadian Honey Exhibit in the Food Building at Toronto where the Canadian National Exhibition was held August 26-September 10 not including Sundays.

The Food Building is the largest of its kind in the world. At this display honey was sold. Mr. and Mrs. Clare Allen were in charge.

In another building an Educational Exhibit of honey and honey products was viewed by the majority of the three million who attended the Exhibition this year.

The Exhibition grounds comprise over 300 acres. The buildings are permanent. It costs very little for admission and for bus fare to the grounds. If you want a pleasant, educational, and refreshing vacation you can do no better than to attend this—"The World's Largest Annual Exhibition."

Texaco Bee Film . . .

Pursuant to a long-term project on the part of the Texaco Company to present to the public a high class movie and sound film on each branch of agriculture, there has recently appeared such a film by that company on bees.

The film is entitled "Bees For Hire." We can recommend it as one of the best movie sound films we have seen. Local groups desiring the film for local showing should contact their neighborhood Texaco dealer. Ordinarily there is no charge for the film.

— THANKS —

Thank you for your patronage and may the PRINCE OF PEACE smile kindly on you and yours.

SUNKIST BEE CO. **Convent, La.**

For Honey Cans,
Jars, Bee Supplies and Queens
— Write —
WEAVER APIARIES **Navasota, Texas**

York's Package Bees & Queens for 1956

The Preference of Leading Honey Producers

Looking back on 1955 perhaps many realize the necessity for some changes in methods of operating. With higher expenses facing many operators, it is imperative for everyone to plan for higher quality packages and queens for a more efficient operation. Better quality packages and queens from York filling some of that extra equipment will pay off in additional income.

Write us today of your plans making arrangements for this season's requirements. We are now booking orders for 1956. Whether you are a hobbyist or a commercial beekeeper, you will find buying quality stock from full-time specialists in beekeeping profitable. Advice and information for shipments by parcel post, express, and truck gladly given. Italians, bred for outstanding commercial production, and Dadant Starlines, product of controlled breeding, are available from the same source. Try these lines in 1956.

Dadant's Starlines Quality Bred York's Italians

YORK BEE COMPANY

Jesup, Georgia

(The Universal Apiaries)

P. O. Box 300 412 West Orange Street

Ohio Evergreen Sweet Clover

My immediate area is poor bee pasture, so I have to provide my own and I think the Ohio variety of sweet clover is the answer. This is my second year's trial of this sweet clover and I will have about 32 acres to bloom this year. I expect to seed about 25 acres for next year.

The picture shows a part of a field of this clover with a control strip of uncut clover which was left for comparison. In the picture are my daughter Bunny and myself.

The clipped portion of this field had a little scattered bloom at the end of September. So far this clover has shown itself very vigorous and hardy, and some of the unclipped portion grew to be 9 to 10 feet to the extreme tip. Seed is expensive and hard to get; the only place I found it available was in Oklahoma.

Otto H. Zick, Wisconsin

Ed. Note — Dr. Dunham of the Ohio Experiment Station, Columbus, writes us that some Ohio beekeepers have been very optimistic about this sweet clover. The big difficulty is to harvest the seed as seed formation covers quite an extended period and as a result there is much loss of seed along with difficulty of heavy dry forage when combining it.

NOW Is the Time

Now is the time to order your supplies for 1956. Lumber, wax, labor, cartons, steel and about everything else has advanced in price.

ORDER NOW AT 1955 CATALOG PRICES and SAVE

KELLEY—"The Bee Man"

Ship us your wax for cash, in trade or for working.

Walter T. Kelley Co. Clarkson, Ky.

When You Want Beekeeping Equipment Remember . . .

Lewis Beeware Is the Finest

Beehives — Rotproofed to resist termites, bored dovetails for easy nailing.

Nailless Topbar Frames — Just fold together; only two nails to use.

V Frame Rests — Easy frame removal, no propolis.

I-V Insulating-Ventilating Cover — Hives 6-8 degrees cooler.

Lev-L-Drain Bottom Board — Levels hive, sloping floor drains off moisture.

New Slotted Topbar Frame — For chunk honey. Quick to use; no waxing; no wedge.

When you want equipment with today's newest ideas, buy Lewis-Dadant Beeware. It's amazing how your assembly time and costs can be saved.

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Hamilton, Illinois

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Box 305 Hornell, New York
1010 W. Austin Street Paris, Texas
721 West O'Connell St. Watertown, Wis.
Route 41, South Hahira, Georgia

MEETINGS

Michigan Beekeepers Association
Business Meeting

Date: Friday, December 9, 1955.

Place: Room 33, Union Building, Michigan State University, East Lansing, Michigan.

Time: 10:00 A.M. to 5:00 P.M.

All beekeepers are urged to attend this meeting. Besides settling association business and laying plans for 1956 programs, this meeting provides an opportunity to make contacts for honey sales and become better informed on the marketing picture.

E. C. Martin,
Program Committee

Westchester Co. Beekeepers Assoc.
New Rochelle, N. Y., Dec. 18

The Westchester County Beekeepers Association will hold its annual Christmas Party at the Odd Fellows Hall, 20 Lockwood Ave., New Rochelle, N. Y., on Sunday, December 18, at 2:30 P.M. sharp.

Each member and his family, including visitors, are requested to bring a gift, not to exceed fifty cents. Santa Claus will be on hand to distribute these gifts. Movies will be shown for the children and Christmas Carols will be sung.

A buffet supper will be served by the "Queen Bees." Let's make this a gala Christmas Party.

Mrs. Alfred Roth, Publicity

Louisiana Annual
Baton Rouge, Dec. 12

The Louisiana State Beekeepers Association will hold their annual meeting December 12th in Baton Rouge. The program calls for registration at nine o'clock and meeting called to order at ten A. M. in the Court of Appeals room on the fourth floor of State Capitol building.

Geo. L. Lott

Southern Tier Beekeepers
Binghamton, N. Y., Dec. 15

The annual meeting of the Southern Tier Beekeepers Association of Binghamton, N. Y., will be held at 8 P. M., December 15 in the Farm Bureau Office, City Court House. Everyone is welcome. A light lunch will be served. The speaker will be Mr. Maurice Smith of Ithaca.

H. B. Webb, Sec'y.

Empire State Annual
Schenectady, Dec. 9-10

The Empire State Honey Producers' Association will hold its annual two-day winter meeting at the Van Curler Hotel, in Schenectady, New York, on December 9 and 10. The general theme will be how to get more return per colony and how to lower production costs. There will be a honey-cooking demonstration to interest the ladies.

Out of state speakers expected are Mr. G. F. Townsend, Mr. Shuel, and Mr. Braun from Canada. Commissioner of Agriculture Dan Carey has been invited to speak. All interested in beekeeping are invited to attend.

Mary Cary, Sec'y.

New Jersey Beekeepers Assoc.
Annual Convention
Thursday, January 26, 1956
Auditorium, Y. W. C. A.
140 East Hanover Street
Trenton, New Jersey
Rudolph Patzig, President, presiding

Morning Session

9:30 a. m. Get Acquainted Period.

10:00 Report of President. Report of Secretary-Treasurer, Milton H. Stricker. Reports of officers and standing committees.

11:00 Speaker to be announced.

12:00 Lunch.

Afternoon Session

1:30 p. m. Bee Movie.

2:15 Election of officers.

2:30 Speaker to be announced.

3:15 Report of Robert S. Filmer, Associate Research Specialist in Entomology, N. J. Agricultural Experiment Station.

3.45 Report of Paul L. Holcombe, Inspector of Bee Culture, N. J. Department of Agriculture.

4:00 C. F. Van Atta, Phillipsburg, N. J. "Honey From Bee to Bottle."

Midwestern Beekeepers
Kansas City, Mo., Dec. 11

The Midwestern Beekeepers Association will meet at the I.O.O.F. Hall, 912 Westport Road, Kansas City, Mo. on December 11 at 2:30 P. M. Election of 1956 officers, general discussion, a movie, door prize and refreshments will be features of the program.

Mrs. William Brite, Sec'y.

WHAT IS EAS?

The EAS (Eastern Apicultural Society) was born during the meeting of Eastern States Beekeepers at the University of Maryland in June 1955. Although the name of the organization gives one the impression that the scope of EAS might be a little "long haired" and imposing, it is nothing of the sort. Its aims and purposes will greatly benefit the small beekeeper once its program gets underway.

The following officers were appointed at the University of Maryland meeting. J. Gaston Levitre, President, Rhode Island; Henry B. Poole, 1st Vice President, Massachusetts; Roy Stadel, 2nd Vice President, Connecticut; Maxime V. Manchester, Secretary-Treasurer, Vermont; William K. Davis, Publicity Director, Rhode Island.

Its birth was enthusiastically heralded by delegates representing approximately 14 eastern states and the sincerity of its creation greatly impressed those who attended the meeting at the University of Maryland. All those desiring to participate in its programs will be welcomed. EAS planning will be long-range but its main purpose is to bring together small beekeepers from various state organizations into one united brotherhood for the benefit of the local organization and the beekeeping industry by and large.

It will be noted that its officers were chosen from the New England states mainly because it was unanimously agreed that the first annual meeting of the society should be held in New England. EAS conferences will be held annually in various sections of the Eastern area of the United States, preferably at some University site since the meetings are two-fold—educational and recreational in scope. The 1956 conference will be held at the University of Rhode Island July 13-15. As the site of the annual meeting will rotate from state to state officers will be appointed from the vicinity of the next annual meeting.

W. K. Davis, Publicity Director

Florida Annual

The annual meeting of the Florida State Beekeepers Association was held in Fort Myers, Florida, last month and more than one hundred and twenty-five members attended the two-day meeting.

Highlights of the meeting included an address by Professor F. E. Guyton, of Auburn, Alabama, during which he told of his fourteen years of experience in treating arthritis with bee stings. Also appearing on the program were representatives of the State and Federal Pure Food and Drug Agencies, who discussed the present regulations regarding honey and honey house sanitation.

One of the featured events of the meeting, was the banquet at which the 1956 Florida Honey Queen was selected. Final contestants in this year's contest were Miss Jean Kelley, of Tallahassee, sponsored by the Tupelo District Association; and Miss Betty Ann Markham, of Belle Glade, representing the South Florida Association. After a lengthy deliberation the judges finally selected Miss Markham as the 1956 Queen. Miss Markham was then robed, crowned and presented with her scepter by Mr. Ed Ayers, State Plant Commissioner, who served as toastmaster at the banquet. Miss Markham is scheduled to make several appearances during the year, one of which will be at the Florida State Fair in Tampa, where she will reign over the honey exhibits for one day.

New officers elected at the meeting to serve for the coming year were: Mr. Millard Coggshall, President, Mr. James Russ, Vice President, and Mr. Frank Robinson, Secretary and Treasurer. The Association also selected Clearwater, Florida as the site of the 1956 convention.

Frank Robinson, Secretary

Biloxi Meeting

The annual meeting of the American Beekeeping Federation will again be held by popular request at Biloxi, Mississippi, January 23rd through the 26th, 1956. Everyone that attended the meeting in 1947 was well pleased and particularly interested in when we could return. The meeting is being held at the same hotel, the Buena Vista, which is on the Mississippi Gulf Coast Beach and the Old Spanish Trail, U. S. Highway 90. A modern four-lane concrete highway runs between the hotel and the beach front.

Buena Vista Hotel, Headquarters for Federation Convention.

Biloxi was founded in 1699 by Pierre le Moyne d'Iberville, a French Canadian who led an expedition for King Louis XIV to colonize the French Louisiana Territory. Since that time Biloxi has been under eight different flags. The main industry of Biloxi is the seafood industry and it is among the nation's largest catchers of oysters, shrimp and fish, many of which are packed and processed in local factories. The native people are very friendly and do not mind stopping to talk to strangers.

The annual mean temperature ranges from 67 to 71 degrees. It is very seldom that there is any week without some mild weather. In some years several freezes occur which are of short duration and which are generally the dying-out fronts or tail ends of severe northern blizzards or extreme cold weather. The most severe freeze in the entire history of the Mississippi Gulf Coast occurred one day in February of 1951, as far as this century is concerned. However, flowers of some type are in bloom every month of the year.

Biloxi today is a modern city of 38,000 people and is easily reached by every modern means of transportation. The Buena Vista Hotel is widely known and highly recommended. The guaranteed room rates start at $4.00 single and $7.50 for two persons. The entire hotel is air conditioned and there will be no other meetings going on in the hotel so that the members of the American Beekeeping Federation will be in exclusive possession of all its facilities. All reservations will be honored but it is highly necessary that they be turned in to the hotel as an extra large crowd is expected. In addition to the hotel accommodations there are 2500 rooms available in this section of the Gulf Coast including quite a number of modern motels which have been built in the various coastal communities.

The program of the convention will appear in the January issue of this journal.

Middlesex County Beekeepers Assoc. Waltham, Mass., Dec. 17

The next meeting of the Middlesex County Beekeepers Association (Mass.) is scheduled for Saturday, December 17, at the Waltham Field Station. The meeting is being held one week earlier than usual because of the Christmas holidays. Our Christmas meeting is always a gala one, with an exchange of small gifts among the members, carol singing, and a hoped-for visit from Santa Claus.

At our November meeting, once again we enjoyed the practice of having a pot-luck supper for the members at 6:30 followed by our business meeting and program for the evening. Mr. F. L. Wells, member of the Association, showed us some beautiful colored slides of flowers.

L. C. Proctor, Secretary

HONEY WANTED—Tupelo and Sourwood in sixties.
Send samples and price to
DIXIE WOOD WORKS,
Route 2, Belton, S. C.

"THE MIRACLE OF ROYAL JELLY"
See Ad on Page 463.

Carniolan and Caucasian
Queen rearing over for 1955. Demand for Carniolan and Caucasian queens was beyond our ability to supply on account of freeze in March and April, but are hoping to do better both in quantity and quality for 1956. Booking orders for early March and April queens.
W. D. REAMS
LaBelle, Fla., Box 87

HONEY WANTED
Cut Comb and Extracted
Advise what you have
T. W. BURLESON & SON
WAXAHACHIE, TEXAS

BETTER BRED QUEENS
Three-Banded Italians
Thank you for business you gave us this season. Booking orders for 1956.
CALVERT APIARIES, Calvert, Ala.

WILLIAMS ITALIAN QUEENS
Merry Christmas
and a
Happy New Year
DR. WILLIAMS APIARIES
115 W. Sterling St. Baytown, Texas

Mountain Bred
Italian BEES and QUEENS
Write for Prices.
Nichols Apiaries
Rt. 1, Box 387, Ashland, Ore.

Modern Beekeeping
If you are taking time to read, why not read the best?
Condensed to save you time.
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MODERN BEEKEEPING
The Picture Bee Magazine
Clarkson, Kentucky

Renew Your Subscription

Editorial

So—This Is Christmas . . .

Yes, this is Christmas! We have often criticized the spirit of Christmas as entirely materialistic; presents given and presents received; parties and conviviality; hectic rushing after things. But, as time passes, although these efforts remain a part of it, Christmas has also become a time of helping those less fortunate than we are and, more and more, a time to worship and reaffirm deep spiritual conviction that we do not live by and for ourselves, but with all others and with God.

As an industry, we can be grateful that there has been an improvement in crops after so much failure and, as we think about the past year, we should look forward to a new year of justified expectations for a still greater improvement in our situation. With price support, we had a bulwark of protection which, for the most part, did much to determine the price at which honey would sell. So honey prices steadied under this influence and most honey sold well above support levels with very little resort to loans or government sale. What a fortunate position! If price support can help create a satisfactory market with little cost and honey moves to the consumer without much carry-over, price support is, in our case, entirely justifiable.

Then, too, we have never been so active in distributing our products. There is still a long way to go to match what other food groups are doing but we have made a good start. Let's remember, this Christmas, to back any effort to put honey where it belongs. There are more small distributors now than ever before. We need still more of them. Put your own local sales effort on a sound basis; don't peddle. Step in line with other products. There is no mystery about how to do it. Every food buyer, particularly the retail buyer, like the housewife, is alert to all the appeals and efforts that move food items in volume. Mrs. Beekeeper is just as well informed about food buying as any other Mrs. When honey gets into the food stream it must move with it and not hold back.

So this Christmas, the prayer and the feast over, let's devote some time to what we can do next year to improve our new and substantially better situation.

Sunny Biloxi . . .

In the January number we hope to have a full and detailed program of the Convention of the American Beekeeping Federation in Biloxi, January 23rd through the 26th. The meeting is again at the Buena Vista hotel where the first southern convention of the Federation was held in 1947. Since there is a vacation expectancy involved in the more serious intent of the Convention, attendance should be good. Biloxi is a city of 38,000 and there are many accommodations, the hotels, motels, other nearby communities and other hotels. But do arrange early.

It is too bad that some of us have to stay home. Likely every member of our staff would go if the job would go on without us. But someone in a group like this has to be lucky so the lucky ones will bask in the sunshine and relax with our friends in the industry. What a chance to relax!

We do hope beekeepers will attend in large numbers. Anyone with a good crop of quality honey which has sold at a higher level than for years, owes himself this trip and this opportunity to help with any effort to see that his good fortune continues. It's not too far from likelihood that most industry leaders will be at Biloxi. They never fail. The beekeeper with propolis on his fingers has been far too content to let someone else create his expectancies. If you have a substantial investment in bees you can help yourself at Biloxi. If you are a small beekeeper, and the big majority of beekeepers are small, you can have the time of your life meeting others from far and wide and you too can add your bit to what is done at the Convention.

Of course, no one wants to go to Biloxi without his lady. Of all places to be without your wife or your intended or your newlywed. It's no fun swimming all alone, or dining out, or getting into the spirit of the convention entertainment. Wicht's committee will not fail to come up with fun and frolic, as well as highbrow deliberation. Come one; come all.

The Market Place . . .

BEES AND QUEENS

ITALIANS—Packages, Queens. Martz, Rt. A2, Box 846, Vacaville, Calif.

GOOD QUALITY bees and queens for 1956. Dadant's Starline and our regular strain. Shipment starts in January. Alamance Bee Company, LaBelle, Fla.

FOR SALE

FOR SALE — Electric Hive Loader, with or without two-ton Chevrolet truck. J. M. Cutts & Sons, Chipley, Fla.

LEASE OR SELL, cash, 500 colonies. John Yanik, 16036 Edmore, Detroit 5, Mich.

FOR SALE—Old Taylor Honey Company honey packing business. See display ad page 465.

FOR SALE—8-frame Root equipment for 700 colony apiary. Write for details. E. H. Wadleigh, Monte Vista, Colo.

FOR SALE—65 10-frame colonies. E. A. Quivey, Bowen, Ill.

HONEY and BEESWAX WANTED

HONEY WANTED — Light and light amber, in sixties. Give price. Chester Williams, McDavid, Fla.

WANTED — Any quantity amber honey. Russell Griggs, Hancock, Iowa.

WANTED — Honey and beeswax. State what you have and price. Roscoe F. Wixson, Dundee, N. Y.

WE ARE PAYING top prices on beeswax and honey shipped to one of our plants. Sioux Honey Assn., Lima, Ohio; Rogers, Texas; Anaheim, Calif.; Tacoma, Wash.; and Sioux City, Iowa.

HONEY WANTED—All grades and varieties. Highest cash prices paid. Mail samples. State quantity. HAMILTON & COMPANY, 2613 South Yates Ave., Los Angeles 22, Calif.

WANTED—Honey, amber or light, in any amount. Send sample for prices. Holland Honey Cake Co., Holland, Mich.

WANTED—Extra white and light amber honey. Let us ship you the containers. Sell us your honey for CASH on delivery. The Hubbard Apiaries, Manufacturers of Bee Supplies and Comb Foundation, Onsted, Mich.

WRITE FOR SHIPPING TAGS and current quotations on rendered beeswax. Any amount from one pound up bought. If you have 25 pounds or more, save 25% by letting us work it into foundation for you. Walter T. Kelley Co., Clarkson, Ky.

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COMB HONEY in 4¼ x 1⅞ window cartons. Extracted honey—1, 2, 5-lb. jars. George J. Toft, Buda, Ill.

FOR SALE—New clover honey in 60-lb. cans, by producer. Ray Johnson, Princeville, Ill.

CHOICE CLOVER HONEY in 60's. Ohmert Bee Farms, Dubuque, Iowa.

WHITE CLOVER HONEY in sixties. Ralph Gamber, 910 State, Lancaster, Pa.

POSITIONS AND HELP WANTED

WANTED — Reliable man for 1956 queen and package season. Howard Weaver, Navasota, Texas.

WANTED—Expert beekeeper. Permanent position. Farr, 4851 Paddock Road, Bond Hill, Cincinnati, Ohio.

TWO RELIABLE, experienced men. Immediate opening. Schreiber Honey Company, Box 194, Gooding, Idaho.

WOULD YOU LIKE TO WORK with one of the West's largest and most progressive bee outfits? If you are under 30 years of age, have clean habits and are serious about giving your best to be part of our organization, contact us. Box 70, c/o American Bee Journal.

MAKE $135 AND UP every week. Full or part time. Take orders for America's largest selling, nationally advertised Liquid Fertilizer since 1946. Written Guarantee. No investment. Excellent opportunity for expansion. Write "Na-Churs" Plant Food Co., 641 Monroe Street, Marion, Ohio.

WANTED—Experienced bee man. Immediate work, housing furnished. Most modern equipment to work with. Raymond Thomas, Inc., Five Points, Fresno County, Calif.

WANTED

WANTED—1000 10-frame hive bodies with frames or drawn combs. No junk. Russell Griggs, Hancock, Iowa.

WANTED—A Neises gravity clarifier, No. 2 size. State price and condition in first letter. Helen's Apiaries, Welch, Minn.

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ROYAL JELLY—30 capsules, $1.50. Capsui contains Royal Jelly 10 mg., Vitamin B 5 mg., Calcium Pantothenate 5 mg. 8-oz. jar honey with 320 mg. Royal Jelly, $2.00 or $18.00 per dozen. Prairie View Honey Co., 12303 Twelfth St., Detroit 6, Mich.

BRAND MELTERS and all kinds of bee supplies. Catalogue free. Hodgson Bee Supplies Ltd., 565—13th Ave., New Westminster, B. C.

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HONEY PLANTS our specialty. Catalogue on request. Pellett Gardens, Atlantic, Iowa.

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KNOW interesting facts about the bees of India through the INDIAN BEE JOURNAL, published in English by the Bhupen Apiaries (Himalayas), Ramgarth, Dist. Nainital, U.P., India, and obtainable from them. Subs. Rs9/-, or $.15/-, or $2.25 yearly. Sample copy, post free, Rs.1/8/-, or $.2/6 or 40c (International money order). Payment in mint postage stamps of your country accepted.

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BEES removed from house or tree to hive without touching either house or bees. Bees will then move honey into hive. Save property, honey and bees with my method. Send $2 for details. Satisfaction guaranteed. George Hawkins, Rt. 1, Lawson, Mo.

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Cub Scout Activities . . .

October was honey bee month with the Cub Scouts of America. Our own office was busy showing local youngsters for many miles around the intricacies of the beehive. No doubt many beekeepers were called upon for help. When we consider that there are over 400,000 Cub Scouts in the United States one must realize that every agency had a part in helping spread information, from local bee folks and local libraries to bee magazines and bee supply houses. We need the fire that youth adds to progress in our industry as well as any other occupation.

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Box 230 Alhambra, Calif.

CROPS and MARKETS

by M. G. Dadant

How is Honey Selling?

With extremely few exceptions, reports coming in indicate that honey is selling at least as well as last year and in some cases much better than last year during the opening fall season.

In fact, the reports of the government of the increasing percentage having left the hands of the producers is an indication of this we believe. No doubt the early cold spells have had some influence and, of course, the fact that the market was almost bare of honey when the fall season started may have indicated that some were anxiously waiting for the new crop of honey to arrive.

Retail Honey Prices

Here we have a difference of action depending largely on the section of the country. We might say that where beekeepers are selling most of the crop themselves or only to one intermediary, the retail store, and in the east and south particularly, prices have not been inclined to advance very much over last year. In the north central states, however, and extending throughout all of the west, the tendency has been for a general advance of ten per cent. This also applies to the large city markets practically all over the country. This is well understandable due to the price paid for early honey.

The same rules in the Canadian Provinces where retail prices have definitely advanced.

Honey Needs

We asked our reporters whether or not honey would be needed from the outside to be sure of a constant supply during the winter and spring season. Here again there was a variation. Generally those sections which do most of their selling from producer to market or through a retail store seemed to be not too anxious over honey stocks. Apparently the activity in selling depends somewhat on the amount of honey on hand. Pretty generally, however, throughout central western areas and this even applies into California, there was a feeling that local stocks would not be sufficient and that importations would have to be made. Of course, in many instances, honey had been sold outside in bulk lots and there might have to be a return to honey in retail packages to offset this. In a general way we would say, however, that honey from outside is more generally needed to supply local markets than has been the case in a number of years.

This is particularly true throughout all of the Canadian Provinces. Here apparently the big packers in Canada fortified themselves by early purchases at very nice prices from the northern sections of the United States, paying as high as 15c per pound f.o.b. shipping point. Here also this price was not excessive since Canadian honey is bringing at least this much or enough more to compensate for the duty on honey going into the country.

Bulk Purchase Prices

As a general rule, bulk prices are apparently lowest in the South and southeastern states, ranking best throughout the central western and plains states, again with a dropping tendency in intermountain and Pacific Coast territory. On the whole it should be difficult to buy white honey at less than 14c per pound with prices ranging as high as 16c on quantity lots. Amber honey ranges generally 1c to 2c less than white, although the stock of amber honey is extremely limited this year and no doubt it will be sold to bakers or for blending purposes without having to sacrifice much in price.

Summary

All in all, bees are going into winter in better than average shape, both as to stores and size of cluster. Some sections have a deficiency where fall feeding has had to be done. However, these are exceptions rather than the rule.

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With no carry-over from the 1954 season and the brisk demand this fall, it looks possible that the large crop of this year may be moved without difficulty and that no doubt prices now in effect will be maintained. We question very much whether the government estimates of a 10% to 15% increase in crop over a year ago is warranted in view of the fact that we have fewer beekeepers. However, their cross section should be correct.

All in all, conditions do look favorable for prices, a good clean-up of honey before the 1956 crop, and if the winter weather is not too severe, for good colonies of bees in the spring and advantageous circumstances as to honey plants.

Legume Seed and Prices . . .

Legume seeds are moving slowly from the farms according to the Marketing Service of the U. S. Department of Agriculture. This is probably accounted for by the lower prices for seeds compared to 1954. All legume seeds including alfalfa, red clover, alsike, sweet clover and white clover are generally lower than in 1954.

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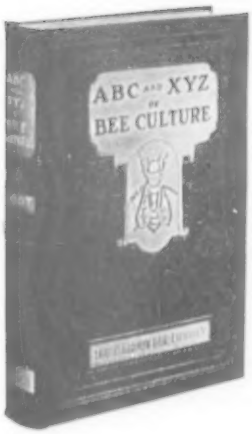

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